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Introduction
-------------------------------------------------------------------------------
The latest routine international evaluation for conformation traits took place
as scheduled at the Interbull Centre. Data from twenty four (24) countries were
included in this evaluation.

International genetic evaluations for calving traits of bulls from
Australia, Belgium, Canada, Switzerland, Germany, Denmark-Finland-Sweden,
Spain, France, United Kingdom, Hungary, Ireland, Italy, Japan, Korea, The Netherlands, Norway,
New Zealand, Poland, South Africa, Estonia, Slovenia, Portugal and the United States of America were computed.
Brown Swiss, Guernsey, Holstein, Jersey  and Red Dairy Cattle breed
data were included in this evaluation.


The WHFF trait definitions are available on this link http://www.interbull.org/ib/conf_trait_hol_jer

The following is a list of substitute traits as applied by countries:

COU BRD TRT_Code    TRT_NAME      Subs_Trt
----------------------------------------
USA |BSW |ofr      | overall frame   | sta
USA |BSW |oru      | overall rump    | rwi
USA |BSW |rle      | rump length     | rwi
USA |BSW |thp      | thurl position  | rwi
Changes in national procedures
-------------------------------------------------------------------------------
Changes in the national genetic evaluation of conformation traits are as
follows:

NOR (RDC)            Delivered RBV's for all traits. The scaling is according to a rolling base that change somewhat at each evaluation. Therefore percentage changes in sire standard deviations between evaluations may solely be due
                    to changes in the standard deviation in the rolling base.
JPN (HOL)           Some changes in proofs caused by additional records and in EDCs caused by modification of pedigree.
POL (HOL)           Small decrease in number of herds and daughters due to edits caused decrease of EDC.
NZL (ALL)           Drops in information due to continuous DNA parenting testing
SVN (ALL)           Base change
ESP (HOL)           Base change
CZE (HOL)           Made changes in herd book related to bulls category. No foreign information for BVs are used therefore all previous ToP "21" appear now as 11 or 12 as all information comes from domestic daughters.


INTERBULL CHANGES COMPARED TO THE PREVIOUS ROUTINE RUN
-------------------------------------------------------------
Subsetting:
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As decided by the ITC in Orlando, new subsetting was introduced
in the september test run. Sub-setting is necessary for operational
purposes and restrictions of time scales. To minimize the effect of
subsetting, larger subsets with 10-12 countries and with 4 link
providing countries have been applied.


Window:
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According to the decision taken by ITC in Orlando, the following
changes have been introduced in regards to the windows used for
post processing:

The upper bounds have been set to 0.99 as these were judged to have
very little effect on evaluations. The lower values have been
set to about the 25% percentile value. The largest changes are for
the lower values for conformation traits, with the lowest window being
40% for OFL otherwise it is about 50% for all other confirmation traits.
It is anticipated that these low values may not have large impact on
evaluations since there were very few countries combinations  whose
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estimated correlations fell between the old limit of 0.30 and these new limits.

The window so far applied for MAS evaluation have been found too high compared to the
within-country genetic correlation between mastitis and SCS available from the literature.
It has been an ITC recommendation to adjust the windows for MAS in this test run to make them more in line with the
values available from the literature. The recommendation has been approved by the Steering committee.
Also, according to the decision taken by ITC in Orlando (2015) to review all windows every five (5) years, an overall
review of the windows for all traits will take place during the first half of 2020 with the aim of implementation set for the September 2020 test run.

DATA AND METHOD OF ANALYSIS

Data were national genetic evaluations of AI sampled bulls with at least
10 daughters or 10 EDC (for clinical mastitis and maternal calving traits at least
50 daughters or 50 EDC, and for direct calving traits at least 50 calvings or 50 EDC) in at
least 10 herds. Table 1 presents the amount of data included
in this Interbull evaluation for all breeds.

National proofs were first de-regressed within country and then analysed
jointly with a linear model including the effects of evaluation country,
genetic group of bull and bull merit. Heritability estimates used in both
the de-regression and international evaluation were as in each country's
national evaluation.

Table 2 presents the date of evaluation as supplied by each country

Estimated genetic parameters and sire standard deviations are shown in APPENDIX I
and the corresponding number of common bulls are listed in APPENDIX II.

SCIENTIFIC LITERATURE

The international genetic evaluation procedure is based on international work
described in the following scientific publications:

International genetic evaluation computation:
    Schaeffer. 1994. J. Dairy Sci. 77:2671-2678
    Klei, 1998. Interbull Bulletin 17:3-7

Verification and Genetic trend validation:
    Klei et al., 2002. Interbull Bulletin 29:178-182.
    Boichard et al., 1995. J. Dairy Sci. 78:431-437

Weighting factors:
    Fikse and Banos, 2001. J. Dairy Sci. 84:1759-1767

De-regression:
    Sigurdsson and G. Banos. 1995. Acta Agric. Scand. 45:207-219
    Jairath et al. 1998. J. Dairy Sci. Vol. 81:550-562

Genetic parameter estimation:
    Klei and Weigel, 1998, Interbull Bulletin 17:8-14
    Sullivan, 1999. Interbull Bulletin 22:146-148

Post-processing of estimated genetic correlations:
    Mark et al., 2003, Interbull Bulletin 30:126-135
    Jorjani et al., 2003. J. Dairy Sci. 86:677-679
    https://wiki.interbull.org/public/rG%20procedure?action=print

Time edits
    Weigel and Banos. 1997. J. Dairy Sci. 80:3425-3430

International reliability estimation
    Harris and Johnson. 1998. Interbull Bulletin 17:31-36

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NEXT ROUTINE INTERNATIONAL EVALUATION
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Dates for the next routine evaluation can be found on
http://www.interbull.org/ib/servicecalendar.

NEXT TEST INTERNATIONAL EVALUATION
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Dates for the next test run can be found on
http://www.interbull.org/ib/servicecalendar.


PUBLICATION OF INTERBULL ROUTINE RUN
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Results were distributed by the Interbull Centre to designated
representatives in each country. The international evaluation file comprised
international proofs expressed on the base and unit of each country included
in the analysis. Such records readily provide more information on bull
performance in various countries, thereby minimizing the need to resort to
conversions.

At the same time, all recipients of Interbull results are expected to honor
the agreed code of practice, decided by the Interbull Steering Committee,
and only publish international evaluations on their own country scale.
Evaluations expressed on another country scale are confidential and may only
be used internally for research and review purposes.


PUBLICATION OF INTERBULL TEST RUN
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Test evaluation results are meant for review purposes only and should not be
published.


^LTable 1. National evaluation data considered in the Interbull
evaluation for conformation traits (August Routine Evaluation 2020).
Number of records for stature by breed
--------------------------------------------------------------------------------
Country      BSW         GUE          HOL          JER          RDC          SIM
--------------------------------------------------------------------------------
AUS                       45         3774          721          236
BEL                                  1562
CAN          213         100        11718          737          856
CHE         2747                     3277           42
CZE                                  4097
DEA         3506
DEU                                 19450                       235
DFS                                 11947         1988         6249
ESP                                  3897
EST                                   743
FRA          358                    16873
FRM
GBR           20         216         5961          433          310
HUN                                  2672
IRL                                  1701
ISR
ITA         2091                     8776          101
JPN                                  5709
KOR                                  1307
LTU
LVA
NLD          125                    14788           43           51
NOR                                                           2379
NZL                                  6213         3897          587
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POL                                      8616
PRT                                      2091
SVK
SVN              308                      531
URY
USA              847          694       32592         4161          255
ZAF                                       843          537
HRV
MEX
CAM                                                                  33
===============================================================================
No.Records    10215         1055       169138        12660        11191
Pub. Proofs    8226          903       136408        11061        11915          0
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^LAPPENDIX I. Sire standard deviations in diagonal and genetic correlations below diagonal
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BSW   sta

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	6.45								
CHE	0.95	12.42							
FRA	0.98	0.96	0.93						
ITA	0.96	0.95	0.95	14.61					
NLD	0.95	0.95	0.96	0.92	4.22				
USA	0.98	0.95	0.97	0.95	0.94	1.64			
DEA	0.97	0.98	0.97	0.96	0.96	0.97	11.32		
SVN	0.92	0.90	0.91	0.93	0.91	0.91	0.92	16.14	
GBR	0.96	0.93	0.96	0.94	0.93	0.96	0.91	0.90	0.77

BSW   cwi

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	8.61								
CHE	0.89	10.23							
FRA	0.86	0.87	0.95						
ITA	0.81	0.85	0.86	21.85					
NLD	0.91	0.80	0.87	0.70	4.59				
USA	0.90	0.90	0.92	0.85	0.82	0.91			
DEA	0.86	0.82	0.76	0.74	0.82	0.77	11.50		
SVN	0.86	0.86	0.82	0.86	0.80	0.87	0.87	22.78	
GBR	0.91	0.84	0.82	0.72	0.90	0.81	0.77	0.81	1.45

BSW   bde

	CAN	CHE	FRA	ITA	NLD	DEA	SVN	GBR	USA
CAN	6.75								
CHE	0.85	10.28							
FRA	0.74	0.88	0.91						
ITA	0.78	0.91	0.91	18.11					
NLD	0.83	0.85	0.86	0.85	4.24				
DEA	0.83	0.90	0.92	0.90	0.84	11.25			
SVN	0.79	0.76	0.77	0.84	0.80	0.74	25.38		
GBR	0.86	0.89	0.81	0.85	0.90	0.87	0.85	1.54	
USA	0.73	0.75	0.85	0.78	0.87	0.78	0.79	0.86	0.84

BSW   ang

	CAN	CHE	FRA	NLD	USA	GBR
CAN	8.39					
CHE	0.70	11.00				

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FRA        0.88       0.67       0.87
NLD        0.80       0.68       0.71       3.83
USA        0.89       0.67       0.78       0.78       1.09
GBR        0.89       0.77       0.80       0.83       0.90       0.73


---------------------------------------------------------------------------
BSW     ran
---------------------------------------------------------------------------
           CAN        CHE        FRA        ITA        NLD        USA        DEA        SVN        GBR
CAN        6.96
CHE        0.94      10.65
FRA        0.97       0.96       0.94
ITA        0.94       0.93       0.94      23.09
NLD        0.95       0.92       0.96       0.93       4.49
USA        0.97       0.94       0.97       0.92       0.95       1.36
DEA        0.96       0.94       0.95       0.94       0.91       0.97      11.91
SVN        0.92       0.91       0.92       0.91       0.92       0.92       0.91      21.49
GBR        0.96       0.94       0.97       0.94       0.97       0.97       0.92       0.93       1.98


---------------------------------------------------------------------------
BSW     rwi
---------------------------------------------------------------------------
           CAN        CHE        FRA        NLD        USA        DEA        GBR        SVN        ITA
CAN        7.19
CHE        0.89      10.12
FRA        0.96       0.86       0.95
NLD        0.92       0.86       0.93       3.96
USA        0.91       0.84       0.87       0.81       0.97
DEA        0.93       0.89       0.93       0.81       0.89      13.38
GBR        0.93       0.87       0.93       0.89       0.93       0.85       1.34
SVN        0.91       0.84       0.94       0.87       0.83       0.90       0.88      26.99
ITA        0.88       0.80       0.89       0.81       0.85       0.86       0.89       0.84      19.89


---------------------------------------------------------------------------
BSW     rls
---------------------------------------------------------------------------
           CAN        CHE        FRA        ITA        NLD        USA        DEA        SVN        GBR
CAN        7.36
CHE        0.92      12.99
FRA        0.91       0.91       1.03
ITA        0.91       0.85       0.93      23.77
NLD        0.88       0.83       0.88       0.85       5.12
USA        0.94       0.93       0.90       0.86       0.86       0.83
DEA        0.93       0.92       0.93       0.89       0.82       0.91      12.30
SVN        0.87       0.83       0.88       0.86       0.83       0.87       0.89      22.10
GBR        0.84       0.87       0.91       0.82       0.86       0.83       0.89       0.83       1.23

---------------------------------------------------------------------------
BSW     fan
---------------------------------------------------------------------------
           CAN        CHE        FRA        ITA        NLD        USA        DEA        SVN        GBR
CAN        8.33
CHE        0.70      13.80
FRA        0.75       0.72       1.09
ITA        0.71       0.85       0.80      22.01
NLD        0.73       0.69       0.84       0.70       5.22
USA        0.80       0.72       0.85       0.85       0.81       0.87
DEA        0.66       0.91       0.66       0.89       0.67       0.66      11.71
SVN        0.70       0.83       0.71       0.85       0.67       0.70       0.94      24.65
GBR        0.81       0.70       0.90       0.74       0.88       0.83       0.71       0.70       1.20


---------------------------------------------------------------------------
BSW     hde
---------------------------------------------------------------------------
           CAN        CHE        FRA        ITA        NLD        DEA        SVN        USA
CAN        8.37
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```
CHE          0.88    12.62
FRA          0.81     0.80    1.16
ITA          0.79     0.83    0.85    22.23
NLD          0.77     0.74    0.84     0.75    5.22
DEA          0.78     0.86    0.83     0.92    0.78    12.26
SVN          0.77     0.76    0.83     0.89    0.75     0.90    30.14
USA          0.85     0.75    0.86     0.89    0.81     0.76    0.83     0.87

------------------------------------------------------------------------
BSW     fua
------------------------------------------------------------------------
             CAN      CHE     FRA      ITA     NLD      USA     DEA      SVN     GBR
CAN          6.99
CHE          0.86    11.87
FRA          0.89     0.87    0.89
ITA          0.90     0.83    0.84    20.60
NLD          0.91     0.85    0.90     0.84    4.56
USA          0.94     0.86    0.87     0.93    0.87     1.32
DEA          0.86     0.85    0.94     0.83    0.83     0.85   11.27
SVN          0.81     0.75    0.84     0.86    0.79     0.79    0.89    21.55
GBR          0.93     0.85    0.88     0.89    0.91     0.92    0.77     0.72    1.26

------------------------------------------------------------------------
BSW     ruh
------------------------------------------------------------------------
             CAN      CHE     FRA      ITA     NLD      USA     DEA      SVN     GBR
CAN          7.55
CHE          0.91    11.78
FRA          0.87     0.84    0.94
ITA          0.78     0.86    0.85    13.03
NLD          0.78     0.85    0.87     0.86    4.27
USA          0.84     0.84    0.88     0.87    0.87     1.10
DEA          0.83     0.86    0.89     0.93    0.91     0.86   11.84
SVN          0.82     0.84    0.80     0.86    0.88     0.81    0.90    19.27
GBR          0.76     0.81    0.87     0.85    0.88     0.91    0.79     0.79    1.51

------------------------------------------------------------------------
BSW     ruw
------------------------------------------------------------------------
             CAN      CHE     FRA      ITA     NLD      USA     DEA      SVN
CAN          8.10
CHE          0.91    11.78
FRA          0.86     0.86    0.85
ITA          0.81     0.88    0.79    13.63
NLD          0.71     0.66    0.79     0.70    4.27
USA          0.86     0.89    0.85     0.89    0.79     1.03
DEA          0.84     0.91    0.76     0.95    0.55     0.90   12.34
SVN          0.81     0.80    0.73     0.83    0.72     0.81    0.81    17.77

------------------------------------------------------------------------
BSW     usu
------------------------------------------------------------------------
             CAN      CHE     FRA      ITA     NLD      USA     DEA      SVN     GBR
CAN          8.13
CHE          0.90    11.96
FRA          0.84     0.91    0.90
ITA          0.89     0.89    0.88    17.89
NLD          0.83     0.83    0.90     0.83    4.19
USA          0.84     0.89    0.87     0.87    0.90     1.01
DEA          0.92     0.92    0.88     0.94    0.78     0.83   11.55
SVN          0.84     0.83    0.72     0.83    0.69     0.74    0.84    23.74
GBR          0.81     0.79    0.87     0.88    0.91     0.93    0.75     0.68    3.05

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BSW     ude
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	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	6.51								
CHE	0.96	12.04							
FRA	0.95	0.95	0.99						
ITA	0.94	0.97	0.95	20.94					
NLD	0.96	0.94	0.95	0.94	4.01				
USA	0.96	0.95	0.96	0.95	0.95	1.23			
DEA	0.93	0.98	0.92	0.97	0.94	0.93	12.07		
SVN	0.93	0.95	0.91	0.97	0.95	0.93	0.95	21.35	
GBR	0.96	0.95	0.96	0.94	0.97	0.96	0.92	0.92	1.80

BSW   ftp

	CAN	CHE	FRA	NLD	USA	DEA	SVN	GBR	ITA
CAN	7.13								
CHE	0.97	13.96							
FRA	0.97	0.95	0.94						
NLD	0.96	0.95	0.95	5.03					
USA	0.92	0.90	0.88	0.91	1.33				
DEA	0.96	0.99	0.95	0.95	0.90	11.06			
SVN	0.94	0.93	0.92	0.93	0.90	0.92	18.05		
GBR	0.96	0.93	0.90	0.94	0.95	0.91	0.93	1.44	
ITA	0.87	0.85	0.85	0.86	0.88	0.85	0.86	0.88	22.08

BSW   ftl

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	6.29								
CHE	0.91	14.67							
FRA	0.94	0.95	0.96						
ITA	0.92	0.94	0.95	18.62					
NLD	0.92	0.96	0.92	0.92	5.02				
USA	0.94	0.96	0.95	0.93	0.96	1.76			
DEA	0.90	0.98	0.98	0.96	0.94	0.96	11.13		
SVN	0.91	0.93	0.90	0.93	0.95	0.91	0.93	18.06	
GBR	0.95	0.94	0.93	0.95	0.97	0.97	0.93	0.94	1.46

BSW   rtp

	CAN	CHE	FRA	ITA	NLD	DEA	SVN	USA
CAN	6.71							
CHE	0.97	14.55						
FRA	0.96	0.97	0.93					
ITA	0.92	0.95	0.93	21.21				
NLD	0.97	0.96	0.97	0.93	4.70			
DEA	0.96	0.99	0.97	0.96	0.94	12.14		
SVN	0.94	0.93	0.92	0.94	0.95	0.92	17.55	
USA	0.93	0.90	0.92	0.90	0.94	0.90	0.91	1.33

BSW   ocs

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	7.73								
CHE	0.86	9.15							
FRA	0.80	0.87	0.97						
ITA	0.83	0.82	0.89	9.51					
NLD	0.76	0.79	0.82	0.78	3.38				
USA	0.85	0.78	0.85	0.83	0.83	0.53			
DEA	0.83	0.91	0.90	0.88	0.77	0.76	10.74		
SVN	0.79	0.78	0.78	0.77	0.78	0.78	0.79	21.28	
GBR	0.82	0.89	0.88	0.82	0.87	0.89	0.82	0.79	1.77

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--------------------------------------------------------------------------------
BSW     ous
--------------------------------------------------------------------------------
        CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN     8.09
CHE     0.89    13.61
FRA     0.88    0.93    0.96
ITA     0.83    0.90    0.90    10.71
NLD     0.88    0.87    0.92    0.80    4.35
USA     0.86    0.89    0.88    0.85    0.87    0.99
DEA     0.87    0.96    0.90    0.91    0.86    0.90    12.48
SVN     0.76    0.83    0.77    0.82    0.78    0.84    0.92    20.19
GBR     0.82    0.85    0.76    0.82    0.77    0.88    0.80    0.76    1.43


--------------------------------------------------------------------------------
BSW     ofl
--------------------------------------------------------------------------------
        CAN     CHE     FRA     ITA     NLD     USA     DEA     SVN     GBR
CAN     8.36
CHE     0.86    11.52
FRA     0.68    0.69    1.27
ITA     0.68    0.72    0.86    16.62
NLD     0.68    0.68    0.75    0.67    4.31
USA     0.75    0.68    0.78    0.74    0.67    1.05
DEA     0.68    0.85    0.69    0.81    0.66    0.66    11.40
SVN     0.76    0.86    0.68    0.77    0.69    0.73    0.89    28.25
GBR     0.74    0.78    0.82    0.69    0.73    0.73    0.70    0.68    1.65


--------------------------------------------------------------------------------
BSW     ofr
--------------------------------------------------------------------------------
        CAN     CHE     DEA     ITA     SVN     USA     FRA
CAN     7.21
CHE     0.83    12.07
DEA     0.88    0.90    11.66
ITA     0.84    0.91    0.95    18.11
SVN     0.81    0.82    0.79    0.85    22.48
USA     0.83    0.85    0.91    0.86    0.79    1.64
FRA     0.82    0.87    0.93    0.91    0.83    0.90    0.90


--------------------------------------------------------------------------------
BSW     tpl
--------------------------------------------------------------------------------
        CAN     CHE     DEA     ITA     SVN     FRA
CAN     6.81
CHE     0.91    11.92
DEA     0.92    0.91    11.78
ITA     0.93    0.92    0.94    24.30
SVN     0.91    0.89    0.89    0.89    23.25
FRA     0.97    0.94    0.91    0.91    0.90    1.30


--------------------------------------------------------------------------------
BSW     oru
--------------------------------------------------------------------------------
        CAN     CHE     DEA     ITA     SVN     USA     FRA
CAN     7.19
CHE     0.77    16.20
DEA     0.71    0.87    12.66
ITA     0.92    0.78    0.75    18.17
SVN     0.84    0.61    0.64    0.72    27.42
USA     0.89    0.55    0.46    0.83    0.69    0.97
FRA     0.90    0.89    0.82    0.89    0.72    0.85    1.10


--------------------------------------------------------------------------------
BSW     rle
--------------------------------------------------------------------------------
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	CHE	DEA	ITA	SVN	USA	FRA
CHE	11.82					
DEA	0.96	12.44				
ITA	0.83	0.87	20.67			
SVN	0.81	0.83	0.83	26.77		
USA	0.54	0.51	0.78	0.73	0.97	
FRA	0.93	0.93	0.90	0.84	0.74	1.03

BSW   thp

	CAN	CHE	DEA	ITA	SVN	USA	FRA
CAN	7.62						
CHE	0.83	11.32					
DEA	0.76	0.85	12.23				
ITA	0.88	0.91	0.83	29.48			
SVN	0.80	0.86	0.85	0.88	36.41		
USA	0.87	0.88	0.70	0.83	0.71	1.36	
FRA	0.89	0.86	0.87	0.85	0.83	0.81	1.02

BSW   hoq

	CAN	CHE	DEA	ITA	SVN	FRA
CAN	6.76					
CHE	0.92	11.92				
DEA	0.92	0.89	12.55			
ITA	0.91	0.82	0.87	19.98		
SVN	0.93	0.87	0.90	0.89	22.21	
FRA	0.90	0.83	0.89	0.89	0.90	1.02

BSW   ful

	CHE	DEA	ITA	SVN	FRA
CHE	11.66				
DEA	0.91	12.45			
ITA	0.91	0.96	12.74		
SVN	0.79	0.87	0.86	20.99	
FRA	0.66	0.81	0.74	0.75	0.96

BSW   udb

	CHE	DEA	ITA	SVN	FRA
CHE	11.72				
DEA	0.97	13.24			
ITA	0.93	0.97	26.57		
SVN	0.81	0.85	0.80	25.71	
FRA	0.91	0.88	0.85	0.79	0.95

BSW   tdi

	CHE	DEA	ITA	SVN	FRA
CHE	15.82				
DEA	0.96	11.41			
ITA	0.94	0.95	21.18		
SVN	0.91	0.92	0.94	17.88	
FRA	0.96	0.96	0.91	0.91	0.93

BSW   tth

	CHE	DEA	ITA	SVN	FRA
CHE	14.38				

```
DEA       0.97   13.03
ITA       0.93    0.93   23.13
SVN       0.88    0.91    0.88   20.29
FRA       0.93    0.92    0.94    0.88     0.87


----------------------------------------------------------------------------
GUE     sta
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.29
GBR       0.97    1.23
USA       0.98    0.96    2.81
AUS       0.91    0.94    0.91    0.84


----------------------------------------------------------------------------
GUE     cwi
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       7.03
GBR       0.92    1.74
USA       0.87    0.86    1.55
AUS       0.72    0.80    0.67    0.38


----------------------------------------------------------------------------
GUE     bde
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.16
GBR       0.87    1.51
USA       0.75    0.89    1.79
AUS       0.83    0.80    0.73    0.41


----------------------------------------------------------------------------
GUE     ang
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       7.92
GBR       0.89    1.77
USA       0.88    0.91    1.91
AUS       0.66    0.77    0.69    0.41


----------------------------------------------------------------------------
GUE     ran
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.52
GBR       0.97    1.63
USA       0.97    0.97    2.02
AUS       0.93    0.96    0.92    0.77


----------------------------------------------------------------------------
GUE     rwi
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       6.76
GBR       0.93    1.50
USA       0.92    0.92    1.74
AUS       0.88    0.87    0.81    0.63


----------------------------------------------------------------------------
GUE     rls
----------------------------------------------------------------------------
          CAN     GBR     USA     AUS
CAN       8.02
GBR       0.82    1.82
USA       0.93    0.80    0.92
```

```
AUS        0.75    0.83    0.74    0.35

-------------------------------------------------------------------------------
GUE     rlr
-------------------------------------------------------------------------------
           CAN     USA     AUS
CAN        7.09
USA        0.84    0.90
AUS        0.64    0.57    0.46

-------------------------------------------------------------------------------
GUE     fan
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        7.77
GBR        0.79    1.70
USA        0.84    0.77    0.88
AUS        0.66    0.79    0.68    0.35

-------------------------------------------------------------------------------
GUE     fua
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        7.17
GBR        0.94    1.68
USA        0.92    0.91    1.85
AUS        0.83    0.81    0.78    0.49

-------------------------------------------------------------------------------
GUE     ruh
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        7.05
GBR        0.76    2.08
USA        0.80    0.91    1.50
AUS        0.78    0.79    0.77    0.44

-------------------------------------------------------------------------------
GUE     usu
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        7.14
GBR        0.80    1.78
USA        0.80    0.86    1.35
AUS        0.81    0.79    0.77    0.38

-------------------------------------------------------------------------------
GUE     ude
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        6.14
GBR        0.97    1.60
USA        0.95    0.95    1.87
AUS        0.94    0.94    0.92    0.53

-------------------------------------------------------------------------------
GUE     ftp
-------------------------------------------------------------------------------
           CAN     GBR     USA     AUS
CAN        5.58
GBR        0.96    1.29
USA        0.92    0.93    1.62
AUS        0.93    0.93    0.87    0.43

-------------------------------------------------------------------------------
GUE     ftl
```

```
---------------------------------------------------------------------
        CAN     GBR     USA     AUS
CAN     4.64
GBR     0.95    1.93
USA     0.95    0.97    2.05
AUS     0.94    0.95    0.94    0.81

---------------------------------------------------------------------
GUE    rtp
---------------------------------------------------------------------
        CAN     AUS     USA
CAN     5.61
AUS     0.93    0.53
USA     0.94    0.91    1.62

---------------------------------------------------------------------
GUE    ocs
---------------------------------------------------------------------
        CAN     GBR     USA     AUS
CAN     8.12
GBR     0.83    2.09
USA     0.80    0.87    0.90
AUS     0.59    0.67    0.61    0.50

---------------------------------------------------------------------
GUE    ous
---------------------------------------------------------------------
        CAN     GBR     USA     AUS
CAN     7.97
GBR     0.83    1.61
USA     0.91    0.84    0.86
AUS     0.73    0.83    0.71    0.58

---------------------------------------------------------------------
GUE    ofl
---------------------------------------------------------------------
        CAN     GBR     USA     AUS
CAN     7.58
GBR     0.74    1.42
USA     0.81    0.70    0.98
AUS     0.49    0.46    0.46    8.89

---------------------------------------------------------------------
HOL    sta
---------------------------------------------------------------------
        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT
AUS    0.64
BEL    0.90   1.06
CAN    0.90   0.95   5.57
CHE    0.89   0.92   0.95   10.62
DEU    0.89   0.93   0.98   0.96   12.89
DFS    0.87   0.95   0.97   0.96   0.97   10.74
ESP    0.89   0.94   0.98   0.96   0.98   0.97   0.83
FRA    0.91   0.96   0.98   0.97   0.97   0.97   0.98   1.07
GBR    0.93   0.93   0.97   0.95   0.96   0.94   0.96   0.97   1.10
ITA    0.86   0.89   0.95   0.92   0.94   0.93   0.95   0.95   0.95   1.12
NLD    0.88   0.93   0.96   0.97   0.98   0.97   0.97   0.97   0.94   0.92   4.14
USA    0.90   0.91   0.98   0.94   0.95   0.95   0.96   0.96   0.97   0.94   0.93   1.20
HUN    0.89   0.93   0.96   0.93   0.96   0.93   0.96   0.97   0.95   0.93   0.94   0.94   0.93
POL    0.85   0.87   0.92   0.90   0.93   0.91   0.93   0.92   0.91   0.90   0.91   0.90   0.92   10.05
NZL    0.88   0.86   0.85   0.85   0.85   0.85   0.85   0.88   0.90   0.85   0.85   0.86   0.85   0.85   0.43
ZAF    0.91   0.91   0.91   0.89   0.90   0.87   0.89   0.91   0.93   0.86   0.86   0.91   0.89   0.86   0.89   0.73
JPN    0.89   0.95   0.98   0.97   0.97   0.97   0.98   0.98   0.96   0.94   0.96   0.97   0.96   0.92   0.86   0.91   1.24
CZE    0.89   0.94   0.97   0.94   0.97   0.95   0.96   0.96   0.95   0.92   0.95   0.94   0.95   0.92   0.85   0.92   0.96   13.36
EST    0.87   0.90   0.93   0.91   0.95   0.94   0.92   0.94   0.91   0.92   0.96   0.90   0.92   0.90   0.85   0.86   0.93   0.94   11.45
IRL    0.88   0.89   0.93   0.91   0.91   0.88   0.92   0.93   0.97   0.92   0.89   0.93   0.92   0.86   0.90   0.90   0.91   0.93   0.87   0.73
```

```
KOR    0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.85   0.86   0.85   0.85   4.54
SVN    0.86   0.92   0.93   0.93   0.94   0.94   0.94   0.94   0.91   0.90   0.96   0.92   0.91   0.93   0.86   0.86   0.94   0.92   0.90   0.87   0.86  14.90
PRT    0.88   0.90   0.94   0.91   0.95   0.93   0.94   0.94   0.94   0.92   0.91   0.92   0.93   0.89   0.85   0.87   0.93   0.94   0.89   0.90   0.85   0.88   1.26
```

HOL   cwi

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0.45																						
BEL	0.67	1.69																					
CAN	0.73	0.86	6.49																				
CHE	0.66	0.85	0.90	11.24																			
DEU	0.69	0.86	0.89	0.84	12.48																		
DFS	0.71	0.87	0.92	0.84	0.93	12.48																	
ESP	0.67	0.88	0.92	0.87	0.82	0.85	1.06																
FRA	0.65	0.90	0.86	0.92	0.86	0.83	0.86	1.15															
GBR	0.81	0.85	0.92	0.85	0.90	0.89	0.85	0.82	1.43														
ITA	0.65	0.78	0.77	0.81	0.70	0.66	0.81	0.88	0.71	1.26													
NLD	0.71	0.87	0.92	0.87	0.94	0.91	0.86	0.86	0.92	0.70	5.02												
USA	0.65	0.82	0.87	0.88	0.82	0.80	0.86	0.92	0.80	0.91	0.82	1.26											
HUN	0.65	0.82	0.85	0.84	0.84	0.83	0.83	0.89	0.77	0.81	0.81	0.88	1.09										
POL	0.65	0.89	0.86	0.83	0.85	0.85	0.87	0.85	0.83	0.78	0.84	0.82	0.83	12.32									
NZL	0.80	0.66	0.71	0.66	0.70	0.70	0.70	0.65	0.80	0.65	0.69	0.67	0.65	0.65	0.38								
ZAF	0.66	0.89	0.85	0.87	0.85	0.86	0.87	0.88	0.90	0.78	0.85	0.87	0.84	0.83	0.70	0.83							
JPN	0.65	0.82	0.76	0.84	0.71	0.71	0.80	0.91	0.66	0.91	0.71	0.91	0.83	0.75	0.64	0.77	1.50						
CZE	0.71	0.90	0.92	0.84	0.91	0.91	0.91	0.84	0.88	0.77	0.89	0.84	0.86	0.89	0.70	0.87	0.77	14.28					
EST	0.71	0.78	0.82	0.74	0.72	0.82	0.81	0.71	0.78	0.65	0.81	0.66	0.66	0.73	0.67	0.72	0.66	0.78	14.74				
IRL	0.77	0.78	0.83	0.80	0.86	0.81	0.74	0.77	0.93	0.67	0.83	0.74	0.74	0.74	0.83	0.84	0.65	0.83	0.71	1.37			
KOR	0.65	0.73	0.65	0.65	0.71	0.72	0.70	0.71	0.66	0.65	0.65	0.69	0.71	0.65	0.67	0.66	0.70	0.76	0.65	0.66	2.60		
SVN	0.66	0.76	0.83	0.80	0.83	0.84	0.83	0.77	0.79	0.71	0.83	0.81	0.82	0.79	0.66	0.84	0.69	0.80	0.71	0.74	0.66	21.06	
PRT	0.66	0.82	0.82	0.78	0.86	0.83	0.81	0.83	0.80	0.74	0.84	0.82	0.84	0.83	0.65	0.78	0.75	0.85	0.66	0.74	0.69	0.75	2.09

HOL   bde

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	ZAF	JPN	CZE	EST	IRL	KOR	PRT	SVN
AUS	0.52																						
BEL	0.70	1.36																					
CAN	0.87	0.77	5.60																				
CHE	0.74	0.91	0.86	11.24																			
DEU	0.79	0.91	0.88	0.90	11.74																		
DFS	0.83	0.85	0.91	0.86	0.93	11.63																	
ESP	0.78	0.90	0.89	0.92	0.91	0.89	0.99																
FRA	0.70	0.92	0.70	0.88	0.82	0.73	0.84	1.07															
GBR	0.80	0.91	0.87	0.91	0.92	0.90	0.93	0.81	1.34														
ITA	0.70	0.87	0.71	0.85	0.84	0.76	0.87	0.89	0.86	1.22													
NLD	0.72	0.88	0.83	0.92	0.91	0.84	0.90	0.86	0.92	0.88	4.78												
USA	0.70	0.92	0.74	0.90	0.88	0.80	0.89	0.92	0.88	0.92	0.90	1.15											
HUN	0.70	0.91	0.79	0.88	0.89	0.85	0.91	0.85	0.89	0.85	0.84	0.90	1.04										
POL	0.79	0.82	0.85	0.81	0.92	0.89	0.87	0.71	0.87	0.79	0.83	0.80	0.86	12.53									
NZL	0.79	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.69	0.70	0.70	0.71	0.38								
ZAF	0.78	0.87	0.84	0.84	0.88	0.87	0.89	0.75	0.92	0.79	0.83	0.85	0.85	0.87	0.70	0.87							
JPN	0.70	0.93	0.73	0.90	0.89	0.81	0.89	0.95	0.86	0.90	0.90	0.94	0.88	0.78	0.69	0.79	1.42						
CZE	0.84	0.83	0.93	0.84	0.94	0.92	0.88	0.70	0.89	0.75	0.83	0.79	0.87	0.92	0.70	0.88	0.78	15.48					
EST	0.77	0.84	0.88	0.85	0.89	0.88	0.89	0.78	0.87	0.77	0.85	0.84	0.85	0.86	0.68	0.81	0.82	0.86	14.00				
IRL	0.82	0.86	0.85	0.88	0.90	0.89	0.88	0.76	0.94	0.83	0.86	0.84	0.83	0.84	0.73	0.89	0.80	0.87	0.80	1.18			
KOR	0.70	0.80	0.70	0.79	0.82	0.82	0.78	0.75	0.75	0.70	0.70	0.73	0.79	0.71	0.70	0.74	0.79	0.78	0.72	0.72	3.34		
PRT	0.78	0.81	0.79	0.78	0.89	0.86	0.83	0.70	0.85	0.77	0.78	0.79	0.84	0.87	0.70	0.83	0.79	0.87	0.78	0.85	0.71	2.01	
SVN	0.79	0.88	0.85	0.89	0.90	0.86	0.92	0.84	0.87	0.83	0.91	0.87	0.86	0.85	0.70	0.80	0.88	0.84	0.85	0.84	0.76	0.77	20.84

HOL   ang

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	ZAF	JPN	CZE	EST	IRL	KOR	PRT	SVN
AUS	0.44																					
BEL	0.60	1.04																				

```
CAN       0.66     0.75     6.52
CHE       0.60     0.77     0.88    11.70
DEU       0.64     0.73     0.84     0.77    12.74
DFS       0.69     0.85     0.89     0.81     0.85    10.53
ESP       0.66     0.76     0.88     0.78     0.73     0.84     0.74
FRA       0.64     0.83     0.88     0.87     0.80     0.88     0.83     0.94
GBR       0.78     0.75     0.91     0.80     0.79     0.87     0.81     0.81     1.51
ITA       0.68     0.74     0.90     0.77     0.79     0.84     0.85     0.81     0.85     1.30
NLD       0.73     0.61     0.81     0.75     0.60     0.71     0.78     0.67     0.83     0.78     4.47
USA       0.69     0.76     0.93     0.81     0.86     0.90     0.84     0.85     0.90     0.86     0.75     1.38
HUN       0.61     0.71     0.76     0.71     0.84     0.78     0.69     0.81     0.71     0.74     0.60     0.79     0.99
POL       0.60     0.67     0.70     0.66     0.61     0.72     0.78     0.72     0.66     0.79     0.64     0.68     0.60    10.40
ZAF       0.65     0.79     0.72     0.67     0.76     0.79     0.69     0.73     0.85     0.76     0.61     0.76     0.76     0.61     0.73
JPN       0.68     0.80     0.90     0.80     0.80     0.90     0.88     0.85     0.86     0.91     0.77     0.88     0.74     0.76     0.77     1.56
CZE       0.64     0.77     0.82     0.74     0.76     0.85     0.74     0.77     0.75     0.79     0.62     0.77     0.80     0.64     0.66     0.79    14.61
EST       0.63     0.75     0.65     0.64     0.71     0.80     0.62     0.67     0.63     0.62     0.60     0.64     0.74     0.62     0.71     0.70     0.76    16.15
IRL       0.74     0.72     0.88     0.77     0.81     0.83     0.80     0.82     0.92     0.83     0.74     0.89     0.73     0.64     0.81     0.86     0.76     0.62     0.74
KOR       0.70     0.77     0.78     0.73     0.73     0.74     0.77     0.74     0.78     0.74     0.62     0.76     0.74     0.62     0.77     0.84     0.69     0.66     0.75     2.29
PRT       0.60     0.69     0.78     0.63     0.76     0.78     0.75     0.73     0.78     0.79     0.60     0.80     0.69     0.65     0.69     0.80     0.70     0.62     0.74     0.77     1.26
SVN       0.70     0.66     0.74     0.76     0.61     0.65     0.70     0.68     0.70     0.74     0.74     0.68     0.61     0.84     0.63     0.71     0.64     0.67     0.64     0.72     0.64    21.91
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HOL   ran

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         AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT
AUS     0.62
BEL     0.95   1.64
CAN     0.93   0.97   6.11
CHE     0.94   0.96   0.96  11.41
DEU     0.93   0.97   0.98   0.95  12.19
DFS     0.93   0.98   0.98   0.96   0.98  11.62
ESP     0.93   0.97   0.97   0.97   0.97   0.96   1.15
FRA     0.96   0.98   0.97   0.97   0.97   0.96   0.97   1.07
GBR     0.96   0.96   0.97   0.95   0.97   0.95   0.96   0.98   1.42
ITA     0.90   0.95   0.95   0.93   0.96   0.94   0.96   0.96   0.95   1.51
NLD     0.92   0.96   0.97   0.95   0.98   0.96   0.97   0.96   0.97   0.94   5.06
USA     0.92   0.95   0.97   0.95   0.96   0.96   0.96   0.96   0.97   0.94   0.96   1.46
HUN     0.93   0.97   0.95   0.95   0.97   0.96   0.97   0.97   0.95   0.95   0.95   0.94   1.01
POL     0.91   0.95   0.95   0.94   0.96   0.95   0.96   0.94   0.94   0.95   0.95   0.92   0.95  11.24
NZL     0.96   0.90   0.90   0.90   0.90   0.90   0.90   0.93   0.94   0.90   0.90   0.90   0.90   0.90   0.34
ZAF     0.96   0.95   0.93   0.92   0.93   0.93   0.94   0.95   0.94   0.91   0.94   0.92   0.95   0.90   0.92   0.88
JPN     0.90   0.95   0.97   0.96   0.96   0.97   0.96   0.94   0.92   0.94   0.94   0.94   0.95   0.95   0.89   0.90   1.44
CZE     0.90   0.94   0.96   0.91   0.97   0.95   0.95   0.93   0.96   0.94   0.96   0.96   0.95   0.94   0.89   0.90   0.93  14.68
EST     0.89   0.92   0.93   0.88   0.94   0.93   0.91   0.91   0.92   0.92   0.95   0.91   0.89   0.92   0.86   0.88   0.90   0.93  14.34
IRL     0.95   0.92   0.93   0.93   0.94   0.91   0.92   0.96   0.98   0.92   0.94   0.94   0.91   0.90   0.94   0.91   0.89   0.90   0.88   1.73
KOR     0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.87   0.89   4.91
SVN     0.91   0.95   0.94   0.93   0.95   0.96   0.94   0.95   0.93   0.94   0.93   0.92   0.92   0.94   0.89   0.89   0.94   0.91   0.90   0.91   0.89  18.05
PRT     0.90   0.92   0.92   0.91   0.94   0.92   0.94   0.94   0.94   0.93   0.93   0.93   0.93   0.91   0.90   0.90   0.90   0.93   0.89   0.90   0.90   0.93   1.80
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HOL   rwi

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         AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    PRT    SVN
AUS     0.52
BEL     0.88   1.43
CAN     0.91   0.95   5.83
CHE     0.89   0.95   0.93  11.10
DEU     0.85   0.93   0.95   0.89  11.44
DFS     0.84   0.92   0.95   0.89   0.97  12.34
ESP     0.92   0.93   0.97   0.91   0.95   0.94   1.00
FRA     0.90   0.96   0.97   0.93   0.95   0.95   0.95   1.11
GBR     0.88   0.91   0.95   0.88   0.90   0.91   0.92   0.94   1.33
ITA     0.80   0.84   0.88   0.82   0.84   0.85   0.88   0.89   0.90   1.31
NLD     0.88   0.95   0.94   0.93   0.96   0.93   0.94   0.95   0.89   0.80   4.80
USA     0.80   0.84   0.91   0.80   0.84   0.87   0.88   0.89   0.94   0.89   0.81   1.28
HUN     0.80   0.91   0.92   0.85   0.92   0.91   0.89   0.93   0.89   0.89   0.89   0.88   1.02
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POL	0.82	0.90	0.92	0.89	0.90	0.90	0.90	0.90	0.88	0.86	0.88	0.82	0.90	11.27									
NZL	0.87	0.84	0.86	0.81	0.81	0.80	0.86	0.84	0.88	0.80	0.83	0.81	0.80	0.80	0.31								
ZAF	0.80	0.82	0.85	0.80	0.84	0.84	0.80	0.84	0.91	0.81	0.80	0.87	0.85	0.81	0.80	0.89							
JPN	0.85	0.95	0.96	0.93	0.94	0.95	0.94	0.97	0.93	0.90	0.93	0.90	0.93	0.91	0.84	0.86	1.36						
CZE	0.85	0.92	0.94	0.88	0.95	0.93	0.94	0.92	0.90	0.86	0.93	0.86	0.91	0.91	0.84	0.82	0.92	15.05					
EST	0.83	0.88	0.90	0.88	0.91	0.88	0.88	0.88	0.85	0.82	0.91	0.80	0.86	0.91	0.81	0.81	0.87	0.90	13.07				
IRL	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.87	0.80	0.80	0.85	0.80	0.80	0.80	0.80	0.80	0.80	0.82	1.58			
KOR	0.80	0.84	0.81	0.81	0.81	0.80	0.80	0.83	0.80	0.79	0.80	0.80	0.82	0.80	0.80	0.80	0.80	0.83	0.80	0.81	0.80	3.36	
PRT	0.80	0.85	0.87	0.80	0.88	0.89	0.86	0.86	0.85	0.84	0.81	0.84	0.88	0.84	0.80	0.83	0.86	0.85	0.81	0.80	0.80	1.74	
SVN	0.85	0.89	0.93	0.90	0.92	0.92	0.92	0.89	0.90	0.80	0.92	0.85	0.84	0.90	0.81	0.85	0.90	0.91	0.88	0.81	0.81	0.81	21.65

HOL   rls

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0.36																						
BEL	0.83	1.83																					
CAN	0.77	0.95	6.26																				
CHE	0.85	0.93	0.93	11.64																			
DEU	0.78	0.94	0.95	0.91	11.94																		
DFS	0.73	0.94	0.97	0.91	0.96	13.31																	
ESP	0.78	0.95	0.95	0.92	0.96	0.95	1.19																
FRA	0.83	0.91	0.88	0.90	0.89	0.88	0.90	1.07															
GBR	0.84	0.87	0.84	0.86	0.86	0.82	0.83	0.91	1.44														
ITA	0.72	0.89	0.89	0.85	0.90	0.90	0.90	0.88	0.82	1.52													
NLD	0.78	0.91	0.92	0.91	0.94	0.93	0.92	0.89	0.87	0.87	5.24												
USA	0.75	0.95	0.96	0.89	0.93	0.95	0.95	0.87	0.82	0.88	0.90	1.64											
HUN	0.79	0.92	0.92	0.87	0.94	0.91	0.94	0.89	0.82	0.90	0.87	0.91	1.03										
POL	0.76	0.92	0.92	0.87	0.95	0.91	0.92	0.89	0.81	0.89	0.86	0.90	0.94	12.01									
NZL	0.73	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.76	0.72	0.72	0.72	0.72	0.72	0.16								
ZAF	0.88	0.82	0.78	0.80	0.76	0.72	0.79	0.84	0.88	0.73	0.77	0.78	0.77	0.79	0.72	0.84							
JPN	0.74	0.92	0.97	0.89	0.94	0.97	0.94	0.87	0.80	0.89	0.89	0.94	0.90	0.93	0.72	0.72	1.79						
CZE	0.78	0.91	0.92	0.83	0.94	0.92	0.91	0.87	0.85	0.87	0.88	0.91	0.92	0.94	0.72	0.78	0.92	15.42					
EST	0.75	0.85	0.84	0.82	0.88	0.86	0.87	0.82	0.74	0.84	0.89	0.85	0.83	0.86	0.69	0.69	0.84	0.82	14.70				
IRL	0.83	0.78	0.73	0.80	0.75	0.73	0.73	0.82	0.90	0.73	0.77	0.73	0.73	0.72	0.74	0.81	0.72	0.75	0.70	1.56			
KOR	0.72	0.81	0.85	0.79	0.83	0.87	0.87	0.81	0.73	0.78	0.82	0.85	0.84	0.81	0.72	0.72	0.86	0.80	0.74	0.71	2.28		
SVN	0.73	0.91	0.94	0.89	0.93	0.95	0.91	0.89	0.81	0.88	0.91	0.91	0.89	0.88	0.72	0.71	0.91	0.85	0.84	0.72	0.81	22.92	
PRT	0.74	0.86	0.83	0.78	0.84	0.84	0.85	0.83	0.77	0.84	0.81	0.84	0.84	0.81	0.72	0.72	0.81	0.81	0.75	0.72	0.81	0.82	2.40

HOL   rlr

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0.42																					
BEL	0.61	1.94																				
CAN	0.59	0.85	6.84																			
CHE	0.72	0.85	0.75	12.08																		
DEU	0.59	0.91	0.88	0.74	11.38																	
DFS	0.61	0.88	0.90	0.75	0.93	12.88																
ESP	0.58	0.87	0.87	0.72	0.87	0.90	1.10															
FRA	0.68	0.91	0.84	0.86	0.85	0.82	0.87	1.07														
GBR	0.54	0.65	0.69	0.56	0.65	0.61	0.70	0.64	1.51													
ITA	0.56	0.78	0.81	0.66	0.77	0.74	0.80	0.82	0.70	1.90												
NLD	0.57	0.89	0.88	0.71	0.92	0.91	0.85	0.83	0.65	0.75	4.04											
USA	0.56	0.78	0.87	0.62	0.76	0.82	0.79	0.77	0.68	0.87	0.80	1.79										
HUN	0.60	0.84	0.77	0.76	0.79	0.78	0.75	0.81	0.54	0.77	0.75	0.78	1.06									
POL	0.57	0.81	0.82	0.67	0.78	0.82	0.76	0.80	0.54	0.78	0.74	0.76	0.72	14.92								
ZAF	0.61	0.71	0.55	0.61	0.54	0.55	0.54	0.64	0.54	0.63	0.55	0.70	0.65	0.62	0.73							
JPN	0.63	0.82	0.87	0.77	0.82	0.91	0.79	0.79	0.54	0.68	0.82	0.76	0.74	0.75	0.55	1.90						
CZE	0.58	0.83	0.81	0.69	0.85	0.81	0.78	0.78	0.56	0.82	0.79	0.78	0.78	0.85	0.68	0.72	16.70					
EST	0.56	0.66	0.57	0.56	0.73	0.77	0.60	0.58	0.55	0.55	0.72	0.56	0.56	0.61	0.53	0.74	0.57	14.35				
IRL	0.54	0.55	0.58	0.54	0.55	0.54	0.60	0.56	0.72	0.68	0.56	0.55	0.54	0.55	0.54	0.54	0.55	0.56	1.67			
KOR	0.58	0.71	0.77	0.64	0.72	0.78	0.80	0.77	0.54	0.69	0.72	0.73	0.65	0.71	0.55	0.77	0.72	0.61	0.55	2.13		
SVN	0.55	0.87	0.78	0.73	0.85	0.86	0.78	0.81	0.55	0.72	0.87	0.79	0.82	0.71	0.55	0.80	0.74	0.66	0.55	0.69	25.82	
PRT	0.57	0.84	0.72	0.66	0.85	0.75	0.75	0.79	0.59	0.71	0.75	0.68	0.71	0.74	0.55	0.64	0.78	0.59	0.54	0.70	0.85	2.51

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HOL    fan
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        AUS     BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     HUN     POL     ZAF     JPN     CZE     EST     IRL     KOR     SVN     PRT
AUS    0.38
BEL    0.71    2.04
CAN    0.65    0.82    7.22
CHE    0.69    0.85    0.77   11.75
DEU    0.73    0.88    0.82    0.76   12.76
DFS    0.65    0.91    0.87    0.76    0.86   12.95
ESP    0.68    0.77    0.86    0.68    0.85    0.81    1.02
FRA    0.81    0.79    0.78    0.72    0.90    0.72    0.85    1.04
GBR    0.78    0.79    0.82    0.70    0.92    0.76    0.85    0.92    1.44
ITA    0.65    0.69    0.76    0.66    0.75    0.71    0.75    0.72    0.75    1.63
NLD    0.73    0.78    0.75    0.70    0.91    0.78    0.79    0.85    0.89    0.73    5.05
USA    0.67    0.75    0.87    0.68    0.84    0.80    0.85    0.82    0.83    0.85    0.81    1.60
HUN    0.81    0.77    0.77    0.76    0.87    0.71    0.84    0.91    0.87    0.67    0.81    0.80    1.10
POL    0.65    0.71    0.75    0.70    0.70    0.71    0.71    0.70    0.68    0.72    0.65    0.75    0.74   13.04
ZAF    0.87    0.77    0.77    0.75    0.83    0.71    0.79    0.86    0.87    0.71    0.75    0.80    0.87    0.66    0.89
JPN    0.77    0.77    0.73    0.82    0.81    0.73    0.75    0.79    0.75    0.66    0.79    0.76    0.86    0.65    0.76    2.06
CZE    0.75    0.86    0.83    0.74    0.91    0.82    0.85    0.88    0.85    0.73    0.81    0.83    0.92    0.73    0.80    0.86   15.84
EST    0.76    0.72    0.70    0.68    0.80    0.73    0.85    0.83    0.79    0.65    0.83    0.73    0.82    0.65    0.70    0.85    0.84   15.50
IRL    0.69    0.68    0.73    0.65    0.80    0.67    0.74    0.76    0.90    0.69    0.75    0.72    0.69    0.66    0.74    0.65    0.71    0.67    1.59
KOR    0.65    0.65    0.72    0.64    0.72    0.65    0.77    0.74    0.72    0.66    0.67    0.74    0.76    0.66    0.66    0.65    0.72    0.66    0.65    1.56
SVN    0.65    0.66    0.72    0.65    0.74    0.74    0.73    0.65    0.69    0.65    0.65    0.73    0.65    0.66    0.65    0.66    0.71    0.64    0.71    0.65   22.05
PRT    0.65    0.65    0.65    0.65    0.75    0.65    0.71    0.74    0.67    0.65    0.69    0.73    0.65    0.65    0.67    0.65    0.71    0.72    0.65    0.73    0.71    2.17


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HOL    fua
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        AUS     BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     HUN     POL     NZL     ZAF     JPN     CZE     EST     IRL     KOR     SVN     PRT
AUS    0.47
BEL    0.77    1.56
CAN    0.80    0.77    5.47
CHE    0.85    0.80    0.92   11.84
DEU    0.77    0.83    0.93    0.85   12.32
DFS    0.81    0.84    0.91    0.89    0.89   11.76
ESP    0.80    0.78    0.88    0.85    0.83    0.82    0.85
FRA    0.82    0.90    0.90    0.87    0.90    0.91    0.84    1.07
GBR    0.80    0.78    0.95    0.87    0.96    0.87    0.87    0.90    1.36
ITA    0.73    0.68    0.89    0.82    0.86    0.77    0.85    0.80    0.90    1.33
NLD    0.78    0.87    0.93    0.90    0.95    0.90    0.86    0.93    0.93    0.82    4.96
USA    0.76    0.69    0.95    0.86    0.90    0.84    0.89    0.84    0.94    0.94    0.88    1.42
HUN    0.83    0.74    0.89    0.87    0.87    0.88    0.82    0.85    0.86    0.80    0.86    0.82    1.04
POL    0.71    0.81    0.85    0.84    0.91    0.87    0.79    0.88    0.88    0.78    0.87    0.80    0.83   11.85
NZL    0.78    0.77    0.83    0.79    0.84    0.79    0.79    0.86    0.88    0.78    0.84    0.84    0.73    0.77    0.42
ZAF    0.78    0.78    0.86    0.82    0.89    0.87    0.81    0.84    0.88    0.75    0.86    0.83    0.83    0.77    0.78    0.86
JPN    0.78    0.74    0.95    0.91    0.89    0.91    0.84    0.86    0.91    0.86    0.89    0.91    0.88    0.85    0.81    0.81    1.50
CZE    0.81    0.85    0.89    0.86    0.94    0.91    0.80    0.91    0.90    0.77    0.91    0.80    0.92    0.90    0.77    0.91    0.87   14.24
EST    0.68    0.74    0.80    0.76    0.78    0.83    0.68    0.82    0.78    0.68    0.81    0.70    0.78    0.79    0.70    0.74    0.73    0.80   14.13
IRL    0.80    0.74    0.84    0.81    0.85    0.75    0.86    0.82    0.92    0.87    0.82    0.88    0.70    0.77    0.85    0.80    0.79    0.77    0.69    1.18
KOR    0.74    0.75    0.70    0.76    0.71    0.77    0.72    0.75    0.69    0.68    0.73    0.68    0.76    0.74    0.68    0.81    0.73    0.79    0.68    0.69    3.24
SVN    0.68    0.80    0.68    0.69    0.69    0.68    0.68    0.69    0.69    0.68    0.68    0.68    0.68    0.68    0.68    0.67    0.68    0.69    0.67    0.68    0.72   17.81
PRT    0.68    0.72    0.68    0.68    0.68    0.68    0.71    0.68    0.68    0.68    0.68    0.68    0.68    0.68    0.70    0.68    0.68    0.68    0.68    0.68    0.69    0.69    1.51


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HOL    ruh
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        AUS     BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     HUN     POL     NZL     ZAF     JPN     CZE     EST     IRL     KOR     SVN     PRT
AUS    0.47
BEL    0.83    1.33
CAN    0.79    0.92    5.49
CHE    0.82    0.90    0.92   11.08
DEU    0.83    0.89    0.88    0.87   13.10
DFS    0.78    0.90    0.87    0.91    0.95   11.54
ESP    0.82    0.86    0.82    0.85    0.91    0.91    0.81
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FRA    0.79    0.89    0.87    0.88    0.90    0.93    0.89    1.08
GBR    0.80    0.82    0.75    0.81    0.86    0.89    0.87    0.88    1.38
ITA    0.75    0.75    0.75    0.75    0.82    0.85    0.89    0.82    0.86    1.29
NLD    0.76    0.83    0.75    0.83    0.92    0.92    0.90    0.87    0.88    0.84    4.36
USA    0.77    0.83    0.83    0.84    0.89    0.92    0.89    0.88    0.93    0.88    0.85    1.50
HUN    0.84    0.77    0.79    0.77    0.87    0.83    0.88    0.83    0.82    0.82    0.81    0.82    0.97
POL    0.75    0.83    0.75    0.76    0.83    0.86    0.86    0.83    0.83    0.83    0.84    0.79    0.79   10.94
NZL    0.81    0.80    0.75    0.82    0.82    0.85    0.83    0.84    0.92    0.81    0.84    0.89    0.83    0.78    0.40
ZAF    0.75    0.77    0.75    0.79    0.78    0.82    0.79    0.75    0.86    0.78    0.77    0.81    0.75    0.75    0.78    0.80
JPN    0.82    0.91    0.92    0.92    0.90    0.93    0.92    0.90    0.83    0.84    0.86    0.86    0.85    0.84    0.82    0.79    1.45
CZE    0.83    0.88    0.88    0.84    0.89    0.86    0.80    0.83    0.75    0.75    0.76    0.79    0.85    0.75    0.76    0.76    0.85   14.84
EST    0.74    0.81    0.78    0.74    0.80    0.82    0.82    0.79    0.78    0.76    0.78    0.81    0.81    0.78    0.78    0.74    0.82    0.78   11.61
IRL    0.75    0.76    0.75    0.76    0.80    0.83    0.84    0.80    0.92    0.87    0.81    0.88    0.78    0.76    0.84    0.80    0.78    0.74    0.75    1.05
KOR    0.75    0.84    0.83    0.76    0.75    0.75    0.76    0.75    0.75    0.75    0.75    0.75    0.75    0.75    0.75    0.75    0.83    0.78    0.74    0.75    3.51
SVN    0.75    0.91    0.85    0.80    0.87    0.86    0.81    0.83    0.76    0.75    0.81    0.76    0.74    0.75    0.74    0.73    0.82    0.83    0.82    0.73    0.80   16.20
PRT    0.75    0.78    0.75    0.75    0.79    0.83    0.85    0.80    0.86    0.84    0.81    0.80    0.79    0.80    0.75    0.76    0.78    0.75    0.75    0.81    0.75    0.76    1.36
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HOL   usu

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       AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT
AUS    0.44
BEL    0.66    1.40
CAN    0.81    0.76    5.61
CHE    0.78    0.88    0.90   11.90
DEU    0.76    0.79    0.92    0.92   11.64
DFS    0.71    0.86    0.80    0.90    0.82   11.50
ESP    0.80    0.69    0.84    0.81    0.79    0.80    0.78
FRA    0.75    0.85    0.78    0.86    0.74    0.91    0.83    1.07
GBR    0.82    0.65    0.81    0.80    0.76    0.82    0.92    0.88    1.34
ITA    0.75    0.70    0.81    0.80    0.79    0.79    0.91    0.82    0.89    1.40
NLD    0.80    0.80    0.84    0.87    0.80    0.90    0.89    0.92    0.92    0.82    4.41
USA    0.80    0.69    0.83    0.79    0.75    0.86    0.91    0.88    0.95    0.89    0.90    1.48
HUN    0.74    0.90    0.82    0.92    0.85    0.91    0.78    0.90    0.78    0.80    0.85    0.80    1.02
POL    0.68    0.76    0.82    0.84    0.89    0.80    0.75    0.71    0.70    0.76    0.75    0.72    0.83   11.50
NZL    0.63    0.63    0.63    0.63    0.63    0.62    0.67    0.63    0.63    0.65    0.63    0.64    0.63    0.64    0.40
ZAF    0.80    0.64    0.67    0.66    0.63    0.76    0.78    0.75    0.81    0.70    0.78    0.83    0.75    0.64    0.64    0.83
JPN    0.63    0.95    0.72    0.84    0.71    0.84    0.63    0.88    0.65    0.66    0.78    0.68    0.88    0.71    0.61    0.63    1.68
CZE    0.63    0.87    0.80    0.86    0.88    0.76    0.65    0.70    0.63    0.69    0.69    0.64    0.88    0.85    0.62    0.63    0.80   14.65
EST    0.71    0.88    0.81    0.85    0.86    0.82    0.68    0.79    0.69    0.68    0.81    0.68    0.84    0.80    0.61    0.62    0.84    0.85   14.26
IRL    0.79    0.70    0.83    0.80    0.80    0.75    0.88    0.80    0.91    0.88    0.84    0.86    0.76    0.75    0.70    0.75    0.64    0.69    0.70    1.07
KOR    0.71    0.69    0.84    0.77    0.81    0.68    0.74    0.64    0.63    0.76    0.65    0.70    0.75    0.81    0.63    0.64    0.65    0.75    0.65    0.69    2.73
SVN    0.66    0.76    0.83    0.78    0.87    0.70    0.65    0.63    0.63    0.63    0.64    0.63    0.69    0.80    0.62    0.60    0.68    0.86    0.81    0.68    0.69   20.72
PRT    0.72    0.65    0.76    0.73    0.81    0.69    0.79    0.63    0.72    0.79    0.72    0.69    0.72    0.75    0.63    0.63    0.63    0.71    0.65    0.77    0.71    0.68    1.62
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HOL   ude

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       AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    ZAF    JPN    CZE    EST    IRL    KOR    SVN    PRT
AUS    0.59
BEL    0.94    1.42
CAN    0.93    0.96    5.43
CHE    0.96    0.95    0.95   11.72
DEU    0.94    0.96    0.98    0.96   13.17
DFS    0.92    0.95    0.97    0.96    0.97   11.83
ESP    0.94    0.97    0.98    0.96    0.97    0.97    1.05
FRA    0.95    0.97    0.97    0.98    0.98    0.97    0.97    1.11
GBR    0.93    0.97    0.97    0.95    0.96    0.94    0.97    0.97    1.32
ITA    0.93    0.95    0.96    0.96    0.96    0.95    0.98    0.97    0.95    1.36
NLD    0.94    0.96    0.97    0.97    0.98    0.96    0.97    0.98    0.97    0.95    4.87
USA    0.93    0.95    0.96    0.96    0.96    0.97    0.97    0.97    0.97    0.96    0.96    1.48
HUN    0.92    0.95    0.96    0.95    0.95    0.95    0.96    0.96    0.95    0.96    0.95    0.95    1.07
POL    0.92    0.95    0.93    0.94    0.95    0.93    0.94    0.94    0.93    0.93    0.94    0.93    0.94   11.26
ZAF    0.92    0.94    0.95    0.92    0.94    0.92    0.93    0.93    0.95    0.91    0.93    0.95    0.93    0.91    0.93
JPN    0.93    0.95    0.97    0.96    0.96    0.97    0.98    0.97    0.95    0.97    0.95    0.97    0.95    0.94    0.91    1.29
CZE    0.93    0.96    0.97    0.94    0.96    0.94    0.95    0.94    0.95    0.94    0.95    0.93    0.96    0.93    0.95    0.93   13.70
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EST    0.91   0.92   0.94   0.92   0.93   0.94   0.93   0.91   0.92   0.92   0.93   0.93   0.92   0.93   0.91   0.92   0.95   12.19
IRL    0.92   0.94   0.91   0.92   0.91   0.90   0.92   0.92   0.96   0.91   0.93   0.94   0.90   0.90   0.95   0.91   0.91   0.89   1.30
KOR    0.90   0.90   0.90   0.90   0.90   0.90   0.91   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.90   0.92   0.90   0.88   0.90   4.73
SVN    0.90   0.93   0.94   0.92   0.95   0.92   0.93   0.93   0.91   0.94   0.94   0.91   0.93   0.94   0.90   0.92   0.95   0.92   0.88   0.90   16.39
PRT    0.90   0.92   0.91   0.90   0.91   0.90   0.91   0.90   0.90   0.92   0.91   0.90   0.91   0.90   0.91   0.90   0.93   0.90   0.90   0.90   0.90   1.60
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HOL   ftp

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0.65																						
BEL	0.95	1.39																					
CAN	0.96	0.96	5.98																				
CHE	0.97	0.97	0.98	11.91																			
DEU	0.96	0.95	0.98	0.96	13.88																		
DFS	0.91	0.96	0.96	0.94	0.95	10.80																	
ESP	0.94	0.92	0.97	0.95	0.97	0.93	0.93																
FRA	0.95	0.99	0.97	0.97	0.95	0.96	0.92	1.10															
GBR	0.94	0.90	0.96	0.93	0.96	0.91	0.96	0.90	1.39														
ITA	0.85	0.85	0.87	0.85	0.86	0.87	0.85	0.85	0.87	1.20													
NLD	0.95	0.97	0.98	0.97	0.98	0.95	0.95	0.97	0.95	0.85	5.17												
USA	0.88	0.87	0.93	0.88	0.92	0.92	0.92	0.87	0.95	0.88	0.90	1.39											
HUN	0.96	0.93	0.95	0.95	0.96	0.92	0.96	0.93	0.93	0.85	0.94	0.89	0.96										
POL	0.89	0.88	0.93	0.89	0.93	0.89	0.92	0.88	0.92	0.85	0.93	0.88	0.90	11.74									
NZL	0.93	0.89	0.92	0.90	0.90	0.86	0.88	0.90	0.91	0.85	0.91	0.87	0.89	0.88	0.32								
ZAF	0.93	0.91	0.95	0.93	0.93	0.90	0.93	0.92	0.93	0.85	0.92	0.89	0.94	0.87	0.90	0.83							
JPN	0.94	0.98	0.97	0.97	0.95	0.95	0.93	0.98	0.90	0.85	0.97	0.86	0.92	0.89	0.89	0.92	1.46						
CZE	0.95	0.95	0.96	0.95	0.95	0.92	0.95	0.93	0.93	0.85	0.95	0.88	0.96	0.91	0.90	0.93	0.94	13.14					
EST	0.94	0.94	0.95	0.94	0.94	0.92	0.93	0.94	0.92	0.85	0.96	0.87	0.92	0.91	0.88	0.89	0.95	0.95	13.06				
IRL	0.92	0.87	0.93	0.91	0.94	0.90	0.92	0.88	0.96	0.85	0.91	0.90	0.89	0.87	0.88	0.90	0.87	0.88	0.89	1.33			
KOR	0.90	0.91	0.91	0.92	0.90	0.91	0.91	0.90	0.87	0.85	0.89	0.85	0.92	0.86	0.85	0.91	0.92	0.91	0.89	0.85	3.27		
SVN	0.94	0.94	0.96	0.95	0.97	0.94	0.96	0.93	0.94	0.85	0.95	0.90	0.94	0.88	0.87	0.88	0.93	0.92	0.92	0.92	0.88	16.24	
PRT	0.90	0.88	0.92	0.89	0.93	0.87	0.93	0.86	0.93	0.85	0.90	0.88	0.92	0.91	0.85	0.87	0.89	0.91	0.90	0.88	0.87	0.92	1.55

HOL   ftl

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0.72																					
BEL	0.95	1.49																				
CAN	0.96	0.93	5.29																			
CHE	0.94	0.96	0.91	11.35																		
DEU	0.96	0.98	0.95	0.96	13.60																	
DFS	0.94	0.97	0.93	0.98	0.98	10.83																
ESP	0.94	0.98	0.93	0.96	0.98	0.97	1.09															
FRA	0.95	0.91	0.98	0.90	0.93	0.92	0.91	1.07														
GBR	0.96	0.97	0.96	0.94	0.98	0.95	0.97	0.94	1.32													
ITA	0.90	0.93	0.93	0.91	0.93	0.92	0.93	0.92	0.95	1.43												
NLD	0.95	0.98	0.93	0.96	0.98	0.97	0.98	0.91	0.97	0.92	4.96											
USA	0.95	0.95	0.96	0.94	0.96	0.95	0.96	0.94	0.97	0.94	0.95	1.45										
HUN	0.90	0.96	0.90	0.96	0.94	0.95	0.95	0.90	0.92	0.90	0.95	0.90	1.04									
POL	0.93	0.96	0.91	0.96	0.97	0.97	0.96	0.90	0.95	0.92	0.96	0.94	0.95	11.10								
ZAF	0.93	0.93	0.90	0.92	0.92	0.93	0.94	0.90	0.93	0.90	0.92	0.92	0.92	0.93	0.86							
JPN	0.95	0.98	0.94	0.97	0.98	0.98	0.98	0.92	0.97	0.93	0.98	0.97	0.95	0.97	0.95	1.43						
CZE	0.94	0.96	0.92	0.97	0.97	0.97	0.97	0.91	0.96	0.92	0.97	0.95	0.95	0.97	0.93	0.98	14.52					
EST	0.93	0.94	0.90	0.94	0.96	0.96	0.94	0.90	0.93	0.91	0.94	0.91	0.93	0.96	0.90	0.95	0.96	13.57				
IRL	0.93	0.95	0.94	0.91	0.96	0.93	0.94	0.94	0.98	0.93	0.94	0.94	0.90	0.92	0.90	0.94	0.94	0.91	1.73			
KOR	0.92	0.94	0.90	0.94	0.93	0.94	0.95	0.90	0.93	0.90	0.94	0.92	0.93	0.93	0.91	0.95	0.93	0.91	0.90	4.46		
SVN	0.90	0.94	0.90	0.95	0.95	0.94	0.95	0.90	0.95	0.92	0.95	0.92	0.92	0.95	0.90	0.95	0.94	0.93	0.92	0.91	17.62	
PRT	0.90	0.95	0.91	0.93	0.95	0.94	0.93	0.90	0.94	0.91	0.94	0.93	0.91	0.94	0.90	0.94	0.95	0.93	0.93	0.90	0.90	1.90

HOL   rtp

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	POL	NZL	JPN	CZE	EST	IRL	KOR	SVN	PRT	ZAF	HUN
AUS	0.52																						

```
BEL     0.94   1.40
CAN     0.93   0.97   6.08
CHE     0.94   0.97   0.98  12.01
DEU     0.92   0.96   0.97   0.97  14.06
DFS     0.90   0.95   0.95   0.95   0.97  11.01
ESP     0.92   0.96   0.97   0.96   0.98   0.96   0.88
FRA     0.94   0.97   0.98   0.98   0.97   0.96   0.98   1.05
GBR     0.94   0.96   0.97   0.97   0.97   0.95   0.97   0.98   1.49
ITA     0.89   0.90   0.89   0.89   0.93   0.92   0.92   0.92   0.91   1.30
NLD     0.93   0.96   0.98   0.97   0.98   0.97   0.98   0.98   0.98   0.91   5.10
USA     0.91   0.94   0.95   0.93   0.95   0.97   0.96   0.95   0.97   0.91   0.96   1.60
POL     0.90   0.93   0.93   0.92   0.96   0.93   0.96   0.94   0.93   0.91   0.95   0.91  11.32
NZL     0.94   0.95   0.95   0.95   0.95   0.91   0.94   0.96   0.96   0.89   0.95   0.91   0.93   0.47
JPN     0.94   0.97   0.98   0.97   0.96   0.96   0.97   0.97   0.96   0.91   0.98   0.96   0.93   0.94   1.50
CZE     0.92   0.97   0.95   0.94   0.96   0.94   0.94   0.94   0.95   0.90   0.94   0.94   0.95   0.93   0.94  14.92
EST     0.93   0.94   0.94   0.94   0.96   0.92   0.94   0.94   0.95   0.90   0.96   0.91   0.94   0.93   0.94   0.93  13.05
IRL     0.91   0.94   0.95   0.94   0.95   0.93   0.94   0.96   0.95   0.89   0.94   0.93   0.90   0.94   0.94   0.90   0.89   1.31
KOR     0.89   0.91   0.93   0.93   0.93   0.93   0.95   0.93   0.90   0.91   0.93   0.91   0.90   0.90   0.94   0.89   0.88   0.90   2.24
SVN     0.89   0.93   0.94   0.94   0.96   0.92   0.96   0.95   0.94   0.91   0.95   0.92   0.94   0.92   0.91   0.92   0.92   0.91   0.92  14.73
PRT     0.89   0.90   0.92   0.89   0.92   0.90   0.92   0.90   0.92   0.89   0.90   0.91   0.91   0.90   0.91   0.90   0.89   0.89   0.89   0.92   1.56
ZAF     0.91   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.89   0.88   0.89   0.89   0.89   0.89   0.56
HUN     0.91   0.95   0.94   0.94   0.97   0.95   0.96   0.96   0.96   0.91   0.96   0.95   0.96   0.92   0.94   0.95   0.94   0.91   0.89   0.94   0.92   0.89   1.02

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HOL    ocs
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        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    JPN    CZE    EST    IRL    KOR    SVN    PRT
AUS    0.65
BEL    0.59   1.17
CAN    0.58   0.75   5.64
CHE    0.61   0.78   0.92  11.56
DEU    0.58   0.75   0.84   0.85  12.97
DFS    0.65   0.75   0.76   0.80   0.86  10.24
ESP    0.66   0.75   0.79   0.80   0.85   0.86   0.80
FRA    0.58   0.75   0.76   0.88   0.86   0.87   0.88   1.10
GBR    0.67   0.75   0.83   0.91   0.92   0.87   0.87   0.89   1.04
ITA    0.55   0.75   0.80   0.83   0.82   0.81   0.85   0.87   0.83   0.80
NLD    0.58   0.75   0.76   0.82   0.89   0.88   0.85   0.85   0.88   0.79   2.88
USA    0.61   0.75   0.82   0.86   0.88   0.87   0.85   0.87   0.90   0.84   0.86   0.90
HUN    0.57   0.75   0.79   0.80   0.82   0.75   0.77   0.80   0.82   0.79   0.75   0.78   1.05
POL    0.56   0.75   0.75   0.75   0.75   0.75   0.75   0.75   0.75   0.75   0.75   0.75   0.75  10.92
NZL    0.78   0.56   0.63   0.63   0.63   0.58   0.61   0.56   0.72   0.56   0.64   0.67   0.57   0.56   0.31
JPN    0.56   0.81   0.86   0.92   0.77   0.75   0.77   0.83   0.77   0.81   0.77   0.82   0.75   0.75   0.56   0.59
CZE    0.63   0.75   0.83   0.82   0.87   0.77   0.80   0.79   0.81   0.76   0.78   0.80   0.84   0.75   0.68   0.75  13.39
EST    0.60   0.76   0.77   0.76   0.78   0.76   0.76   0.76   0.77   0.76   0.76   0.76   0.76   0.76   0.62   0.77   0.76  12.25
IRL    0.60   0.56   0.70   0.69   0.70   0.65   0.68   0.63   0.79   0.66   0.62   0.66   0.65   0.56   0.61   0.58   0.67   0.60   0.90
KOR    0.56   0.75   0.74   0.75   0.74   0.74   0.75   0.74   0.75   0.75   0.75   0.74   0.75   0.75   0.56   0.75   0.75   0.77   0.56   6.52
SVN    0.62   0.81   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.76   0.60   0.76   0.76   0.78   0.58   0.77  18.11
PRT    0.56   0.75   0.75   0.75   0.78   0.78   0.78   0.77   0.80   0.78   0.79   0.76   0.75   0.75   0.56   0.75   0.75   0.76   0.62   0.75   0.76   0.29

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HOL    ous
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        AUS    BEL    CAN    CHE    DEU    DFS    ESP    FRA    GBR    ITA    NLD    USA    HUN    POL    NZL    JPN    CZE    EST    IRL    SVN    PRT
AUS    0.68
BEL    0.73   1.28
CAN    0.73   0.79   5.35
CHE    0.79   0.85   0.95  11.89
DEU    0.76   0.80   0.90   0.92  13.69
DFS    0.63   0.82   0.84   0.89   0.87  12.87
ESP    0.75   0.72   0.84   0.88   0.84   0.79   0.87
FRA    0.68   0.82   0.86   0.93   0.90   0.92   0.83   1.02
GBR    0.86   0.70   0.83   0.87   0.85   0.70   0.89   0.75   1.42
ITA    0.69   0.72   0.86   0.91   0.85   0.83   0.90   0.89   0.83   1.00
NLD    0.66   0.82   0.88   0.94   0.91   0.89   0.83   0.94   0.77   0.85   4.69
USA    0.76   0.77   0.92   0.95   0.90   0.85   0.91   0.89   0.89   0.94   0.89   1.13
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HUN    0.73    0.79    0.83    0.87    0.87    0.81    0.82    0.83    0.78    0.80    0.78    0.82    1.15
POL    0.75    0.81    0.75    0.79    0.78    0.72    0.71    0.74    0.78    0.71    0.71    0.75    0.73   11.78
NZL    0.83    0.69    0.82    0.87    0.80    0.69    0.75    0.79    0.84    0.75    0.80    0.84    0.73    0.73    0.44
JPN    0.79    0.83    0.93    0.94    0.89    0.80    0.82    0.85    0.85    0.86    0.86    0.92    0.80    0.80    0.82    0.74
CZE    0.72    0.86    0.88    0.91    0.94    0.90    0.82    0.92    0.76    0.84    0.89    0.85    0.89    0.75    0.76    0.85   13.24
EST    0.67    0.83    0.82    0.87    0.86    0.90    0.79    0.90    0.74    0.81    0.87    0.85    0.79    0.71    0.72    0.79    0.90   11.93
IRL    0.84    0.61    0.73    0.79    0.77    0.56    0.80    0.67    0.95    0.77    0.67    0.82    0.70    0.72    0.81    0.77    0.70    0.65    0.95
SVN    0.73    0.76    0.71    0.73    0.74    0.71    0.71    0.71    0.71    0.71    0.70    0.71    0.71    0.81    0.64    0.73    0.72    0.72    0.66   18.54
PRT    0.74    0.70    0.79    0.78    0.77    0.70    0.76    0.73    0.80    0.75    0.75    0.79    0.70    0.72    0.74    0.79    0.76    0.72    0.74    0.71    0.44

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HOL    ofl
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        AUS     BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     HUN     POL     JPN     CZE     EST     IRL     SVN     PRT
AUS    5.76
BEL    0.47    1.78
CAN    0.40    0.71    6.46
CHE    0.45    0.78    0.90   11.55
DEU    0.40    0.75    0.84    0.77   11.84
DFS    0.40    0.66    0.86    0.77    0.79   12.90
ESP    0.40    0.72    0.82    0.76    0.71    0.82    0.91
FRA    0.46    0.80    0.70    0.74    0.75    0.65    0.76    1.06
GBR    0.42    0.74    0.75    0.79    0.74    0.71    0.80    0.84    1.57
ITA    0.42    0.72    0.71    0.70    0.71    0.64    0.69    0.80    0.68    1.69
NLD    0.40    0.83    0.68    0.69    0.75    0.65    0.66    0.81    0.74    0.67    4.67
USA    0.40    0.71    0.81    0.77    0.74    0.67    0.73    0.72    0.73    0.77    0.68    1.52
HUN    0.50    0.75    0.65    0.65    0.69    0.64    0.65    0.76    0.65    0.75    0.68    0.71    1.12
POL    0.45    0.70    0.67    0.68    0.68    0.65    0.65    0.67    0.65    0.71    0.65    0.74    0.72   13.60
JPN    0.40    0.65    0.85    0.77    0.77    0.71    0.69    0.65    0.65    0.71    0.65    0.84    0.65    0.73    0.54
CZE    0.43    0.75    0.80    0.72    0.79    0.65    0.65    0.69    0.65    0.78    0.65    0.83    0.81    0.84    0.80   16.78
EST    0.45    0.67    0.66    0.66    0.66    0.66    0.66    0.67    0.66    0.66    0.68    0.66    0.69    0.66    0.67    0.68   14.89
IRL    0.65    0.71    0.74    0.79    0.68    0.66    0.69    0.67    0.78    0.67    0.63    0.66    0.64    0.60    0.68    0.65    0.45    1.36
SVN    0.43    0.74    0.68    0.66    0.68    0.66    0.66    0.67    0.66    0.67    0.70    0.84    0.79    0.79    0.78    0.82    0.72    0.61   25.08
PRT    0.40    0.65    0.65    0.65    0.65    0.65    0.65    0.68    0.65    0.65    0.67    0.65    0.65    0.65    0.65    0.65    0.69    0.48    0.66    0.19

-----------------------------------------------------------------------------
HOL    loc
-----------------------------------------------------------------------------
        BEL     CAN     CHE     DEU     DFS     ESP     FRA     GBR     ITA     NLD     USA     CZE     IRL     KOR     SVN     PRT     EST     HUN
BEL    1.94
CAN    0.85    6.84
CHE    0.55    0.63   12.42
DEU    0.64    0.73    0.68   11.69
DFS    0.87    0.90    0.51    0.66   12.87
ESP    0.60    0.72    0.69    0.73    0.73    0.95
FRA    0.78    0.78    0.71    0.83    0.69    0.76    1.06
GBR    0.66    0.69    0.88    0.82    0.63    0.79    0.85    1.51
ITA    0.61    0.68    0.65    0.73    0.56    0.74    0.78    0.74    1.94
NLD    0.85    0.82    0.71    0.82    0.77    0.68    0.81    0.78    0.64    4.28
USA    0.55    0.71    0.50    0.74    0.63    0.71    0.72    0.67    0.78    0.59    1.52
CZE    0.51    0.61    0.59    0.66    0.60    0.65    0.65    0.66    0.72    0.50    0.66   19.49
IRL    0.58    0.57    0.51    0.66    0.53    0.64    0.69    0.73    0.62    0.64    0.56    0.50    1.67
KOR    0.57    0.72    0.54    0.54    0.63    0.70    0.67    0.52    0.61    0.58    0.57    0.59    0.51   11.08
SVN    0.68    0.64    0.57    0.63    0.63    0.65    0.74    0.67    0.62    0.58    0.58    0.66    0.53    0.58   29.22
PRT    0.50    0.50    0.53    0.61    0.50    0.59    0.53    0.61    0.58    0.52    0.50    0.65    0.51    0.56    0.59    2.31
EST    0.55    0.54    0.53    0.52    0.53    0.53    0.54    0.54    0.52    0.52    0.52    0.54    0.53    0.57    0.68    0.53   14.20
HUN    0.69    0.70    0.52    0.68    0.72    0.59    0.75    0.68    0.65    0.65    0.62    0.83    0.51    0.67    0.64    0.58    0.64    1.15

-----------------------------------------------------------------------------
HOL    bcs
-----------------------------------------------------------------------------
        BEL     CHE     DEU     DFS     FRA     GBR     ITA     NLD     USA     CZE     JPN     IRL     KOR     CAN     PRT     ESP     SVN     EST     HUN     NZL
BEL    1.01
CHE    0.75   11.80
DEU    0.75    0.90   13.37
DFS    0.76    0.89    0.95   12.18
```

FRA	0.75	0.92	0.94	0.95	1.00														
GBR	0.76	0.91	0.90	0.90	0.93	1.54													
ITA	0.75	0.90	0.95	0.95	0.96	0.90	6.66												
NLD	0.75	0.93	0.95	0.96	0.95	0.91	0.93	5.01											
USA	0.77	0.75	0.77	0.78	0.77	0.75	0.76	0.75	1.38										
CZE	0.76	0.86	0.96	0.95	0.92	0.89	0.94	0.93	0.75	14.07									
JPN	0.81	0.92	0.96	0.96	0.96	0.92	0.96	0.95	0.82	0.94	1.83								
IRL	0.75	0.87	0.81	0.85	0.87	0.93	0.82	0.86	0.75	0.78	0.86	1.02							
KOR	0.76	0.76	0.84	0.86	0.86	0.81	0.84	0.79	0.75	0.85	0.87	0.76	2.50						
CAN	0.75	0.92	0.95	0.94	0.94	0.95	0.93	0.95	0.79	0.94	0.97	0.88	0.84	6.07					
PRT	0.75	0.83	0.87	0.86	0.87	0.87	0.83	0.86	0.75	0.83	0.87	0.78	0.82	0.87	1.94				
ESP	0.76	0.88	0.93	0.94	0.95	0.93	0.92	0.92	0.75	0.92	0.95	0.84	0.87	0.95	0.88	1.05			
SVN	0.76	0.85	0.90	0.91	0.86	0.79	0.88	0.92	0.76	0.90	0.89	0.76	0.79	0.85	0.77	0.86	22.42		
EST	0.77	0.83	0.87	0.87	0.85	0.77	0.87	0.89	0.78	0.84	0.88	0.78	0.78	0.83	0.77	0.77	0.87	13.12	
HUN	0.76	0.87	0.94	0.92	0.92	0.88	0.93	0.90	0.75	0.95	0.92	0.76	0.84	0.92	0.83	0.91	0.85	0.81	0.99
NZL	0.76	0.88	0.89	0.90	0.90	0.90	0.91	0.86	0.75	0.86	0.91	0.85	0.76	0.89	0.81	0.84	0.81	0.83	0.86	0.15

JER   sta

	AUS	CAN	DFS	GBR	ITA	NZL	USA	ZAF	NLD	CHE
AUS	0.54									
CAN	0.89	6.61								
DFS	0.90	0.96	11.71							
GBR	0.91	0.96	0.94	1.08						
ITA	0.89	0.94	0.92	0.94	1.33					
NZL	0.89	0.86	0.88	0.92	0.88	0.36				
USA	0.91	0.97	0.95	0.96	0.93	0.89	1.69			
ZAF	0.88	0.87	0.86	0.93	0.87	0.92	0.87	8.91		
NLD	0.90	0.95	0.97	0.94	0.92	0.87	0.94	0.87	4.56	
CHE	0.90	0.96	0.96	0.95	0.92	0.87	0.94	0.88	0.97	11.17

JER   cwi

	AUS	CAN	DFS	GBR	ITA	NZL	USA	ZAF	NLD	CHE
AUS	0.29									
CAN	0.75	6.89								
DFS	0.76	0.85	15.50							
GBR	0.83	0.92	0.84	1.81						
ITA	0.67	0.81	0.71	0.73	1.43					
NZL	0.81	0.69	0.69	0.80	0.67	0.38				
USA	0.76	0.91	0.81	0.84	0.87	0.67	1.04			
ZAF	0.71	0.82	0.72	0.84	0.72	0.80	0.78	8.74		
NLD	0.75	0.91	0.89	0.90	0.71	0.71	0.84	0.81	4.48	
CHE	0.69	0.89	0.87	0.83	0.83	0.69	0.88	0.73	0.86	12.52

JER   bde

	AUS	CAN	DFS	GBR	ITA	NZL	ZAF	NLD	USA	CHE
AUS	0.33									
CAN	0.78	5.75								
DFS	0.83	0.86	13.51							
GBR	0.76	0.86	0.84	1.55						
ITA	0.71	0.73	0.75	0.83	1.44					
NZL	0.78	0.71	0.72	0.72	0.72	0.38				
ZAF	0.83	0.75	0.84	0.82	0.74	0.80	8.98			
NLD	0.71	0.83	0.84	0.90	0.87	0.72	0.79	4.23		
USA	0.70	0.72	0.75	0.78	0.90	0.71	0.73	0.87	1.04	
CHE	0.79	0.87	0.89	0.89	0.83	0.74	0.83	0.91	0.86	13.49

JER   ang

	AUS	CAN	DFS	GBR	ITA	USA	ZAF	NLD	CHE

```
AUS     0.34
CAN     0.65    7.56
DFS     0.70    0.80    13.23
GBR     0.79    0.78    0.86    1.24
ITA     0.67    0.82    0.79    0.85    1.29
USA     0.72    0.83    0.88    0.84    0.77    1.04
ZAF     0.62    0.63    0.70    0.81    0.70    0.69    8.87
NLD     0.71    0.81    0.71    0.82    0.77    0.74    0.65    5.73
CHE     0.63    0.80    0.71    0.72    0.72    0.73    0.64    0.74    10.17

---------------------------------------------------------------------------------
JER     ran
---------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.36
CAN     0.91    5.79
DFS     0.92    0.97    11.42
GBR     0.96    0.95    0.96    1.16
ITA     0.91    0.96    0.94    0.94    1.28
NZL     0.94    0.90    0.90    0.93    0.90    0.30
USA     0.91    0.95    0.96    0.97    0.93    0.90    1.23
ZAF     0.91    0.91    0.91    0.93    0.91    0.91    0.90    9.16
NLD     0.92    0.96    0.96    0.96    0.94    0.90    0.95    0.93    4.85
CHE     0.93    0.96    0.95    0.94    0.94    0.91    0.93    0.91    0.95    13.07

---------------------------------------------------------------------------------
JER     rwi
---------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.32
CAN     0.85    6.45
DFS     0.83    0.91    12.02
GBR     0.83    0.93    0.86    1.43
ITA     0.81    0.85    0.83    0.86    1.62
NZL     0.90    0.85    0.81    0.82    0.81    0.30
USA     0.80    0.84    0.83    0.86    0.86    0.80    1.02
ZAF     0.81    0.81    0.81    0.83    0.81    0.80    0.81    9.34
NLD     0.87    0.94    0.92    0.88    0.81    0.85    0.81    0.81    4.90
CHE     0.86    0.92    0.85    0.86    0.82    0.82    0.81    0.81    0.92    12.26

---------------------------------------------------------------------------------
JER     rls
---------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS     0.18
CAN     0.74    6.01
DFS     0.74    0.95    12.76
GBR     0.78    0.84    0.80    1.70
ITA     0.74    0.84    0.83    0.79    1.59
NZL     0.73    0.73    0.73    0.77    0.74    0.13
USA     0.73    0.93    0.94    0.89    0.82    0.74    0.96
ZAF     0.75    0.74    0.73    0.81    0.74    0.90    0.77    12.12
NLD     0.77    0.91    0.92    0.86    0.86    0.73    0.88    0.77    3.58
CHE     0.81    0.92    0.86    0.83    0.81    0.75    0.86    0.76    0.90    9.50

---------------------------------------------------------------------------------
JER     rlr
---------------------------------------------------------------------------------
        AUS     CAN     DFS     ITA     ZAF     NLD     USA     CHE
AUS     0.21
CAN     0.55    6.61
DFS     0.56    0.75    13.13
ITA     0.56    0.80    0.66    1.06
ZAF     0.56    0.58    0.57    0.59    12.85
NLD     0.56    0.86    0.88    0.73    0.64    4.57
USA     0.55    0.76    0.67    0.81    0.57    0.75    0.96
```

```
CHE       0.66    0.70    0.65    0.64    0.59    0.71    0.60   12.06


-------------------------------------------------------------------------------
JER    fan
-------------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS       0.22
CAN       0.66    5.95
DFS       0.66    0.87   12.76
GBR       0.76    0.78    0.73    1.47
ITA       0.66    0.74    0.69    0.74    1.72
USA       0.65    0.86    0.78    0.85    0.82    0.93
ZAF       0.71    0.68    0.68    0.89    0.68    0.77    9.82
NLD       0.70    0.74    0.79    0.87    0.73    0.79    0.72    3.98
CHE       0.68    0.76    0.79    0.69    0.67    0.69    0.69    0.72   12.24


-------------------------------------------------------------------------------
JER    fua
-------------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS       0.38
CAN       0.79    5.55
DFS       0.81    0.86   12.54
GBR       0.80    0.94    0.85    1.66
ITA       0.72    0.87    0.79    0.87    1.42
NZL       0.82    0.73    0.73    0.81    0.74    0.43
USA       0.78    0.94    0.88    0.92    0.91    0.73    1.64
ZAF       0.76    0.91    0.86    0.92    0.83    0.75    0.90   11.82
NLD       0.78    0.92    0.89    0.92    0.83    0.84    0.87    0.87    4.49
CHE       0.83    0.92    0.84    0.87    0.82    0.75    0.87    0.88    0.90   10.87


-------------------------------------------------------------------------------
JER    ruh
-------------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS       0.36
CAN       0.77    6.97
DFS       0.77    0.87   10.88
GBR       0.84    0.81    0.84    1.30
ITA       0.76    0.79    0.82    0.86    1.39
NZL       0.76    0.76    0.79    0.80    0.80    0.43
USA       0.78    0.84    0.90    0.91    0.83    0.78    1.26
ZAF       0.85    0.75    0.82    0.89    0.81    0.76    0.86    9.36
NLD       0.76    0.77    0.91    0.88    0.84    0.83    0.86    0.78    4.07
CHE       0.81    0.91    0.85    0.84    0.79    0.79    0.83    0.78    0.83   12.59


-------------------------------------------------------------------------------
JER    usu
-------------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS       0.39
CAN       0.81    6.49
DFS       0.72    0.85   12.91
GBR       0.83    0.88    0.84    1.83
ITA       0.70    0.77    0.72    0.80    1.54
NZL       0.64    0.65    0.65    0.66    0.66    0.42
USA       0.74    0.85    0.87    0.84    0.79    0.64    0.98
ZAF       0.78    0.81    0.75    0.82    0.67    0.64    0.79   10.33
NLD       0.82    0.84    0.88    0.91    0.81    0.65    0.88    0.79    4.83
CHE       0.77    0.90    0.88    0.80    0.78    0.66    0.84    0.76    0.86    9.77


-------------------------------------------------------------------------------
JER    ude
-------------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS       0.35
```

```
CAN        0.95    5.35
DFS        0.94    0.94   12.11
GBR        0.94    0.97    0.94    1.45
ITA        0.94    0.94    0.93    0.93    1.35
USA        0.92    0.96    0.95    0.94    0.95    1.82
ZAF        0.91    0.91    0.92    0.93    0.91    0.91   10.65
NLD        0.91    0.96    0.96    0.96    0.94    0.95    0.92    3.94
CHE        0.95    0.95    0.94    0.94    0.95    0.94    0.91    0.96    9.16

-------------------------------------------------------------------------
JER    ftp
-------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     NZL     USA     ZAF     NLD     CHE
AUS        0.46
CAN        0.91    6.28
DFS        0.88    0.95   12.85
GBR        0.92    0.93    0.91    1.35
ITA        0.86    0.87    0.86    0.86    1.76
NZL        0.90    0.93    0.87    0.87    0.86    0.31
USA        0.89    0.96    0.95    0.93    0.87    0.89    1.33
ZAF        0.87    0.93    0.91    0.93    0.86    0.90    0.90   10.32
NLD        0.93    0.97    0.94    0.94    0.85    0.90    0.90    0.90    5.60
CHE        0.93    0.95    0.92    0.92    0.86    0.88    0.90    0.88    0.96   10.18

-------------------------------------------------------------------------
JER    ftl
-------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     USA     ZAF     NLD     CHE
AUS        0.32
CAN        0.92    5.76
DFS        0.92    0.92   13.94
GBR        0.93    0.92    0.94    1.44
ITA        0.91    0.91    0.91    0.93    1.66
USA        0.92    0.92    0.94    0.97    0.92    1.12
ZAF        0.94    0.90    0.91    0.94    0.91    0.97   10.98
NLD        0.94    0.93    0.97    0.97    0.92    0.96    0.93    4.58
CHE        0.93    0.92    0.94    0.96    0.91    0.94    0.93    0.96   11.97

-------------------------------------------------------------------------
JER    rtp
-------------------------------------------------------------------------
           AUS     CAN     DFS     NZL     ZAF     NLD     USA     CHE
AUS        0.31
CAN        0.89    6.43
DFS        0.90    0.95   12.94
NZL        0.90    0.96    0.92    0.41
ZAF        0.89    0.94    0.90    0.90    9.60
NLD        0.91    0.97    0.96    0.94    0.90    4.95
USA        0.89    0.91    0.94    0.90    0.89    0.94    1.39
CHE        0.91    0.98    0.96    0.95    0.93    0.97    0.92   11.36

-------------------------------------------------------------------------
JER    ocs
-------------------------------------------------------------------------
           AUS     CAN     DFS     GBR     ITA     NZL     USA     NLD     CHE
AUS        0.79
CAN        0.57    6.27
DFS        0.61    0.76   12.66
GBR        0.64    0.84    0.84    2.64
ITA        0.57    0.81    0.79    0.82    0.73
NZL        0.64    0.59    0.58    0.64    0.59    0.32
USA        0.65    0.79    0.81    0.87    0.81    0.63    0.88
NLD        0.60    0.77    0.87    0.88    0.80    0.64    0.84    2.71
CHE        0.63    0.90    0.79    0.91    0.81    0.63    0.84    0.83    7.79

-------------------------------------------------------------------------
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```
JER    ous
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     NZL     USA     NLD     CHE
AUS     0.79
CAN     0.69    6.49
DFS     0.57    0.84    12.78
GBR     0.76    0.88    0.72    1.43
NZL     0.81    0.72    0.62    0.74    0.46
USA     0.66    0.90    0.78    0.85    0.66    1.04
NLD     0.64    0.88    0.89    0.78    0.75    0.89    4.34
CHE     0.72    0.92    0.81    0.86    0.69    0.88    0.93    10.60


-------------------------------------------------------------------------------
JER    ofl
-------------------------------------------------------------------------------
        AUS     CAN     DFS     GBR     ITA     USA     NLD     CHE
AUS     6.33
CAN     0.52    6.01
DFS     0.42    0.81    13.64
GBR     0.58    0.72    0.67    1.34
ITA     0.43    0.73    0.65    0.72    1.11
USA     0.65    0.82    0.67    0.72    0.76    1.62
NLD     0.42    0.68    0.66    0.73    0.67    0.67    4.56
CHE     0.48    0.87    0.72    0.73    0.69    0.74    0.69    10.71


-------------------------------------------------------------------------------
RDC    sta
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     0.62
CAN     0.89    6.33
DEU     0.90    0.97    13.56
DFS     0.89    0.97    0.97    8.63
GBR     0.93    0.96    0.96    0.93    1.29
NOR     0.92    0.94    0.96    0.98    0.93    13.41
NZL     0.90    0.90    0.87    0.91    0.92    0.93    0.48
USA     0.91    0.97    0.95    0.94    0.97    0.93    0.89    2.37
NLD     0.89    0.95    0.97    0.97    0.94    0.96    0.86    0.93    4.40
CAM     0.93    0.92    0.92    0.92    0.92    0.93    0.92    0.92    0.92    6.04


-------------------------------------------------------------------------------
RDC    cwi
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR
AUS     0.42
CAN     0.74    7.38
DEU     0.72    0.87    11.33
DFS     0.79    0.83    0.89    12.77
GBR     0.83    0.88    0.89    0.87    1.62
NZL     0.80    0.70    0.72    0.69    0.82    0.35
USA     0.69    0.85    0.82    0.83    0.84    0.71    1.30
NLD     0.75    0.92    0.92    0.89    0.91    0.70    0.82    5.12
CAM     0.81    0.81    0.81    0.81    0.81    0.82    0.82    0.81    7.06
NOR     0.83    0.82    0.80    0.83    0.83    0.83    0.83    0.87    0.82    15.03


-------------------------------------------------------------------------------
RDC    bde
-------------------------------------------------------------------------------
        AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS     0.44
CAN     0.83    6.15
DEU     0.80    0.87    9.81
DFS     0.83    0.84    0.92    11.78
GBR     0.78    0.86    0.92    0.89    1.56
NOR     0.83    0.83    0.80    0.89    0.83    14.69
NZL     0.80    0.71    0.74    0.76    0.75    0.82    0.35
```

```
USA        0.72    0.76    0.88    0.83    0.89    0.83    0.74    1.30
NLD        0.71    0.83    0.90    0.85    0.91    0.82    0.71    0.90    4.22
CAM        0.85    0.83    0.84    0.84    0.84    0.84    0.86    0.84    0.84    4.85


---------------------------------------------------------------------------
RDC    ang
---------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     USA     NLD     CAM
AUS        0.49
CAN        0.65    7.10
DEU        0.65    0.83   12.69
DFS        0.67    0.80    0.84    9.08
GBR        0.77    0.81    0.78    0.83    1.38
USA        0.69    0.86    0.86    0.85    0.85    1.22
NLD        0.73    0.81    0.62    0.74    0.83    0.75    4.87
CAM        0.78    0.76    0.76    0.77    0.75    0.77    0.78    7.05


---------------------------------------------------------------------------
RDC    ran
---------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS        0.42
CAN        0.92    6.04
DEU        0.93    0.97    8.98
DFS        0.92    0.94    0.95   10.03
GBR        0.95    0.97    0.97    0.95    1.53
NOR        0.92    0.94    0.92    0.91    0.95   12.16
NZL        0.94    0.93    0.91    0.91    0.94    0.93    0.28
USA        0.92    0.98    0.96    0.94    0.97    0.95    0.92    1.68
NLD        0.92    0.97    0.98    0.96    0.97    0.95    0.90    0.96    5.98
CAM        0.94    0.95    0.95    0.95    0.95    0.95    0.95    0.95    0.95    5.52


---------------------------------------------------------------------------
RDC    rwi
---------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NZL     USA     NLD     CAM     NOR
AUS        0.41
CAN        0.88    6.09
DEU        0.85    0.94    9.64
DFS        0.87    0.93    0.93   10.48
GBR        0.88    0.92    0.90    0.88    1.42
NZL        0.86    0.88    0.82    0.89    0.91    0.33
USA        0.81    0.91    0.84    0.88    0.94    0.87    1.41
NLD        0.88    0.94    0.95    0.93    0.89    0.85    0.81    5.90
CAM        0.89    0.88    0.87    0.89    0.88    0.89    0.88    0.88    6.41
NOR        0.87    0.89    0.87    0.95    0.88    0.90    0.88    0.90    0.89   13.95


---------------------------------------------------------------------------
RDC    rls
---------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS        0.26
CAN        0.76    6.37
DEU        0.78    0.94    9.36
DFS        0.74    0.97    0.94    9.22
GBR        0.81    0.80    0.86    0.79    1.63
NOR        0.78    0.90    0.90    0.96    0.83   13.47
NZL        0.74    0.74    0.74    0.74    0.76    0.78    0.13
USA        0.73    0.93    0.93    0.94    0.82    0.87    0.74    0.91
NLD        0.77    0.92    0.92    0.89    0.86    0.81    0.73    0.90    5.13
CAM        0.83    0.84    0.84    0.83    0.84    0.84    0.82    0.84    0.84    6.22


---------------------------------------------------------------------------
RDC    rlr
---------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     NOR     NLD     USA     CAM
```

	AUS	CAN	DEU	DFS	NOR	NLD	USA	CAM
AUS	0.31							
CAN	0.60	6.47						
DEU	0.61	0.88	10.00					
DFS	0.60	0.84	0.91	10.75				
NOR	0.65	0.77	0.85	0.89	15.20			
NLD	0.56	0.87	0.91	0.89	0.86	4.62		
USA	0.56	0.73	0.76	0.70	0.74	0.80	0.91	
CAM	0.79	0.75	0.74	0.74	0.74	0.74	0.75	6.87

RDC   fan

	AUS	CAN	DEU	DFS	GBR	NOR	USA	NLD	CAM
AUS	0.30								
CAN	0.66	6.32							
DEU	0.72	0.81	14.24						
DFS	0.66	0.73	0.80	9.30					
GBR	0.75	0.79	0.91	0.72	1.63				
NOR	0.71	0.74	0.84	0.66	0.76	14.40			
USA	0.69	0.84	0.84	0.74	0.84	0.76	1.06		
NLD	0.70	0.75	0.89	0.77	0.88	0.69	0.80	4.53	
CAM	0.75	0.76	0.76	0.76	0.76	0.76	0.76	0.76	7.70

RDC   fua

	AUS	CAN	DEU	DFS	GBR	NOR	NZL	USA	NLD	CAM
AUS	0.45									
CAN	0.78	5.58								
DEU	0.78	0.91	12.44							
DFS	0.78	0.82	0.83	11.67						
GBR	0.79	0.88	0.95	0.87	1.56					
NOR	0.85	0.83	0.76	0.87	0.83	12.88				
NZL	0.76	0.82	0.82	0.73	0.80	0.77	0.36			
USA	0.76	0.93	0.90	0.84	0.92	0.83	0.87	1.50		
NLD	0.79	0.93	0.93	0.89	0.92	0.88	0.84	0.88	4.15	
CAM	0.81	0.83	0.83	0.83	0.83	0.83	0.84	0.84	0.83	6.41

RDC   ruh

	AUS	CAN	DEU	DFS	GBR	NOR	NZL	USA	NLD	CAM
AUS	0.51									
CAN	0.79	5.71								
DEU	0.82	0.87	14.84							
DFS	0.78	0.88	0.89	10.65						
GBR	0.80	0.77	0.86	0.86	1.45					
NOR	0.79	0.84	0.87	0.87	0.83	12.82				
NZL	0.81	0.76	0.82	0.79	0.92	0.80	0.33			
USA	0.77	0.85	0.89	0.91	0.89	0.85	0.85	1.39		
NLD	0.76	0.76	0.91	0.92	0.88	0.91	0.84	0.85	4.18	
CAM	0.82	0.83	0.83	0.83	0.85	0.83	0.85	0.84	0.83	5.95

RDC   usu

	AUS	CAN	DEU	DFS	GBR	NOR	NZL	USA	NLD	CAM
AUS	0.40									
CAN	0.76	5.79								
DEU	0.74	0.90	12.67							
DFS	0.69	0.74	0.78	12.56						
GBR	0.80	0.81	0.76	0.78	1.85					
NOR	0.71	0.75	0.72	0.77	0.78	13.58				
NZL	0.68	0.73	0.66	0.65	0.72	0.73	0.33			
USA	0.79	0.82	0.76	0.82	0.89	0.79	0.71	1.22		
NLD	0.79	0.83	0.80	0.89	0.92	0.83	0.64	0.90	4.56	

```
CAM        0.78    0.81    0.78    0.79    0.80    0.78    0.82    0.81    0.80    6.51

--------------------------------------------------------------------------------
RDC    ude
--------------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM
AUS        0.50
CAN        0.93    5.46
DEU        0.94    0.97   12.44
DFS        0.92    0.97    0.95   10.74
GBR        0.93    0.96    0.96    0.94    1.85
NOR        0.92    0.95    0.93    0.91    0.95   11.91
USA        0.90    0.97    0.96    0.96    0.97    0.95    1.30
NLD        0.93    0.97    0.97    0.95    0.97    0.96    0.96    4.20
CAM        0.94    0.95    0.95    0.95    0.95    0.95    0.95    0.95    4.65

--------------------------------------------------------------------------------
RDC    ftp
--------------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS        0.54
CAN        0.93    5.43
DEU        0.94    0.97   13.22
DFS        0.89    0.94    0.92   11.85
GBR        0.93    0.93    0.95    0.89    1.52
NOR        0.89    0.91    0.89    0.88    0.92   11.78
NZL        0.93    0.90    0.89    0.86    0.89    0.89    0.27
USA        0.88    0.92    0.92    0.92    0.93    0.92    0.87    1.46
NLD        0.94    0.98    0.97    0.95    0.95    0.88    0.91    0.90    4.61
CAM        0.92    0.92    0.92    0.92    0.92    0.92    0.92    0.92    0.93    6.52

--------------------------------------------------------------------------------
RDC    ftl
--------------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM
AUS        0.46
CAN        0.94    4.84
DEU        0.96    0.94   13.85
DFS        0.95    0.91    0.98   10.55
GBR        0.95    0.94    0.98    0.94    1.41
NOR        0.94    0.94    0.94    0.93    0.95   12.83
USA        0.95    0.94    0.96    0.93    0.97    0.95    1.66
NLD        0.94    0.93    0.98    0.97    0.97    0.94    0.95    5.43
CAM        0.94    0.95    0.95    0.95    0.95    0.95    0.95    0.95    7.42

--------------------------------------------------------------------------------
RDC    rtp
--------------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     NOR     NZL     NLD     USA     CAM
AUS        0.40
CAN        0.92    6.22
DEU        0.91    0.96   14.38
DFS        0.90    0.94    0.96   12.14
NOR        0.92    0.93    0.91    0.90   13.72
NZL        0.93    0.96    0.94    0.90    0.92    0.35
NLD        0.91    0.98    0.97    0.96    0.91    0.95    5.56
USA        0.91    0.92    0.95    0.93    0.94    0.91    0.96    1.46
CAM        0.93    0.94    0.94    0.94    0.94    0.93    0.94    0.94    6.26

--------------------------------------------------------------------------------
RDC    ocs
--------------------------------------------------------------------------------
           AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS        0.70
CAN        0.61    5.34
DEU        0.60    0.83   20.49
```

```
DFS       0.68    0.76    0.82   10.46
GBR       0.68    0.81    0.92    0.83    1.60
NOR       0.66    0.84    0.81    0.76    0.86   11.69
NZL       0.74    0.61    0.64    0.60    0.68    0.71    0.28
USA       0.64    0.82    0.89    0.82    0.89    0.86    0.72    0.57
NLD       0.61    0.76    0.88    0.85    0.88    0.79    0.65    0.86    3.04
CAM       0.77    0.86    0.86    0.86    0.86    0.86    0.80    0.87    0.86    5.94

-----------------------------------------------------------------------
RDC    ous
-----------------------------------------------------------------------
          AUS     CAN     DEU     DFS     GBR     NOR     NZL     USA     NLD     CAM
AUS       0.67
CAN       0.72    5.45
DEU       0.73    0.89   17.35
DFS       0.60    0.81    0.82   10.97
GBR       0.84    0.83    0.85    0.74    1.57
NOR       0.60    0.84    0.83    0.82    0.88   11.29
NZL       0.83    0.79    0.77    0.71    0.78    0.61    0.36
USA       0.75    0.91    0.90    0.89    0.88    0.88    0.84    1.00
NLD       0.67    0.88    0.91    0.89    0.77    0.82    0.79    0.88    4.05
CAM       0.72    0.89    0.88    0.88    0.89    0.88    0.72    0.90    0.90    6.37

-----------------------------------------------------------------------
RDC    ofl
-----------------------------------------------------------------------
          AUS     CAN     DEU     DFS     GBR     NOR     USA     NLD     CAM
AUS       7.30
CAN       0.42    5.62
DEU       0.43    0.83   16.03
DFS       0.42    0.80    0.79   13.29
GBR       0.43    0.74    0.74    0.69    1.40
NOR       0.49    0.72    0.75    0.66    0.74   14.88
USA       0.46    0.75    0.75    0.67    0.72    0.74    1.33
NLD       0.42    0.69    0.75    0.66    0.74    0.72    0.67    6.38
CAM       0.56    0.74    0.74    0.74    0.74    0.74    0.74    0.74    6.97

----------------------------------------------------------------------------------------------
^LAPPENDIX II. Number of common bulls
----------------------------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
     CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 ---------------------------------------------------------------------
 CAN    0  118   72  118   39  138  104   28   16
 CHE   99    0  153  447   63  260  500   60   14
 FRA   61  112    0  171   54   90  171   44   13
 ITA   99  388  133    0   85  199  539   77   15
 NLD   32   59   43   67    0   56   79   31   10
 USA  122  231   61  147   42    0  214   29   16
 DEA   82  407  124  455   69  171    0   74   12
 SVN   25   57   42   75   30   24   69    0    7
 GBR   12   12   12   13    8   14   10    5    0
 ---------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
     CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
 ---------------------------------------------------------------------
 CAN    0  112   43  118   33  138  102   27   16
 CHE   96    0   90  392   58  231  437   57   14
 FRA   38   61    0   98   35   54  109   35   10
 ITA   99  334   74    0   77  199  504   75   15
```

```
    NLD    29    56    30    63     0    42    73    31    10
    USA   122   198    35   147    33     0   196    28    16
    DEA    81   348    75   419    67   146     0    72    11
    SVN    24    54    34    73    30    23    68     0     7
    GBR    12    12     9    13     8    14    10     5     0
    --------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN   CHE   FRA   ITA   NLD   DEA   SVN   GBR   USA
    --------------------------------------------------------------------------

    CAN     0   118    72   118    33   104    21    16   138
    CHE    99     0   153   447    62   500    46    14   260
    FRA    61   112     0   171    50   171    32    13    90
    ITA    99   388   133     0    77   539    59    15   199
    NLD    29    59    40    63     0    74    23    10    42
    DEA    82   407   124   455    68     0    55    12   214
    SVN    19    42    32    56    23    52     0     6    21
    GBR    12    12    12    13     8    10     4     0    16
    USA   122   231    61   147    33   171    18    14     0
    --------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN   CHE   FRA   NLD   USA   GBR
    --------------------------------------------------------------------------

    CAN     0   117    72    22   137    16
    CHE    99     0   148    39   258    14
    FRA    61   108     0    32    90    13
    NLD    19    39    27     0    27     7
    USA   121   231    61    22     0    16
    GBR    12    12    12     5    14     0
    --------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN   CHE   FRA   ITA   NLD   USA   DEA   SVN   GBR
    --------------------------------------------------------------------------

    CAN     0   118    72   118    39   138   104    28    16
    CHE    99     0   153   447    63   260   500    60    14
    FRA    61   112     0   171    54    90   171    44    13
    ITA    99   388   133     0    85   199   539    77    15
    NLD    32    59    43    67     0    56    79    31    10
    USA   122   231    61   147    42     0   214    29    16
    DEA    82   407   124   455    69   171     0    74    12
    SVN    25    57    42    75    30    24    69     0     7
    GBR    12    12    12    13     8    14    10     5     0
    --------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN   CHE   FRA   NLD   USA   DEA   GBR   SVN   ITA
    --------------------------------------------------------------------------

    CAN     0   118    43    39   138   104    16    21   115
    CHE    99     0    90    63   260   500    14    46   440
    FRA    38    61     0    35    54   109    10    32    98
    NLD    32    59    30     0    56    79    10    23    84
    USA   122   231    35    42     0   214    16    21   187
    DEA    82   407    75    69   171     0    12    55   533
    GBR    12    12     9     8    14    10     0     6    15
    SVN    19    42    32    23    18    52     4     0    59
    ITA    97   382    74    67   135   448    13    56     0
```

BSW
----

 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN CHE FRA ITA NLD USA DEA SVN GBR

 CAN   0 118   72 118   39 138 104   28   16
 CHE   99   0 153 447   63 260 500   60   14
 FRA   61 112   0 171   54   90 171   44   13
 ITA   99 388 133   0   85 199 539   77   15
 NLD   32   59   43   67   0   56   79   31   10
 USA   122 231   61 147   42   0 214   29   16
 DEA   82 407 124 455   69 171   0   74   12
 SVN   25   57   42   75   30   24   69   0   7
 GBR   12   12   12   13   8   14   10   5   0

BSW
----

 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN CHE FRA ITA NLD USA DEA SVN GBR

 CAN   0 118   72 118   32 138 104   28   16
 CHE   99   0 153 447   61 260 500   60   14
 FRA   61 112   0 171   50   90 171   44   13
 ITA   99 388 133   0   76 199 539   77   15
 NLD   28   58   40   62   0   41   73   31   10
 USA   122 231   61 147   31   0 214   29   16
 DEA   82 407 124 455   67 171   0   74   12
 SVN   25   57   42   75   30   24   69   0   7
 GBR   12   12   12   13   8   14   10   5   0

BSW
----

 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN CHE FRA ITA NLD DEA SVN USA

 CAN   0 118   72 115   32 104   28 138
 CHE   99   0 153 441   61 500   60 260
 FRA   61 112   0 170   50 171   44   90
 ITA   97 383 133   0   76 533   77 187
 NLD   28   58   40   62   0   73   31   41
 DEA   82 407 124 448   67   0   74 214
 SVN   25   57   42   75   30   69   0   29
 USA   122 231   61 135   31 171   24   0

BSW
----

 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN CHE FRA ITA NLD USA DEA SVN GBR

 CAN   0 118   43   79   32 138   71   21   16
 CHE   99   0   90 276   62 259 306   46   14
 FRA   38   61   0   90   34   54   99   32   10
 ITA   71 227   67   0   57 103 257   52   12
 NLD   28   59   29   52   0   41   61   23   10
 USA   122 231   35   76   32   0 117   21   16
 DEA   59 241   68 223   56   82   0   53   9
 SVN   19   42   32   50   23   18   50   0   6
 GBR   12   12   9   10   8   14   8   4   0

BSW

```
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
  -------------------------------------------------------------------------
  CAN     0  118   72  118   33  138  104   28   16
  CHE    99    0  153  447   62  260  500   60   14
  FRA    61  112    0  171   50   90  171   44   13
  ITA    99  388  133    0   77  199  539   77   15
  NLD    29   59   40   63    0   42   74   31   10
  USA   122  231   61  147   33    0  214   29   16
  DEA    82  407  124  455   68  171    0   74   12
  SVN    25   57   42   75   30   24   69    0    7
  GBR    12   12   12   13    8   14   10    5    0
  -------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN
  -------------------------------------------------------------------------
  CAN     0  118   72  118   33  138  104   28
  CHE    99    0  153  447   62  260  500   60
  FRA    61  112    0  171   50   90  171   44
  ITA    99  388  133    0   77  199  539   77
  NLD    29   59   40   63    0   42   74   31
  USA   122  231   61  147   33    0  214   29
  DEA    82  407  124  455   68  171    0   74
  SVN    25   57   42   75   30   24   69    0
  -------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
  -------------------------------------------------------------------------
  CAN     0  118   72  118   39  138  104   21   16
  CHE    99    0  153  447   63  260  500   46   14
  FRA    61  112    0  171   54   90  171   32   13
  ITA    99  388  133    0   85  199  539   59   15
  NLD    32   59   43   67    0   56   79   23   10
  USA   122  231   61  147   42    0  214   21   16
  DEA    82  407  124  455   69  171    0   55   12
  SVN    19   42   32   56   23   18   52    0    6
  GBR    12   12   12   13    8   14   10    4    0
  -------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
  -------------------------------------------------------------------------
  CAN     0  118   72  118   39  136  104   28   16
  CHE    99    0  153  447   63  260  500   60   14
  FRA    61  112    0  171   54   90  171   44   13
  ITA    99  388  133    0   85  199  539   77   15
  NLD    32   59   43   67    0   56   79   31   10
  USA   121  231   61  147   42    0  214   29   16
  DEA    82  407  124  455   69  171    0   74   12
  SVN    25   57   42   75   30   24   69    0    7
  GBR    12   12   12   13    8   14   10    5    0
  -------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        CAN  CHE  FRA  NLD  USA  DEA  SVN  GBR  ITA
```

```
--------------------------------------------------------------------------------
CAN     0  118   72   39  138   93   27   16  107
CHE    99    0  153   63  260  468   58   14  405
FRA    61  112    0   54   90  161   43   13  158
NLD    32   59   43    0   56   73   31   10   76
USA   122  231   61   42    0  189   28   16  157
DEA    74  376  116   67  143    0   72   11  446
SVN    24   55   41   30   23   68    0    7   74
GBR    12   12   12    8   14   10    5    0   15
ITA    90  351  121   63  116  384   72   13    0
--------------------------------------------------------------------------------
```

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	0	118	72	118	39	138	104	27	16
CHE	99	0	153	447	63	260	500	59	14
FRA	61	112	0	171	54	90	171	43	13
ITA	99	388	133	0	85	197	539	76	15
NLD	32	59	43	67	0	56	79	31	10
USA	122	231	61	146	42	0	214	28	16
DEA	82	407	124	455	69	171	0	73	12
SVN	24	56	41	74	30	23	68	0	7
GBR	12	12	12	13	8	14	10	5	0

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	DEA	SVN	USA
CAN	0	118	72	79	28	71	27	138
CHE	99	0	150	276	58	306	58	259
FRA	61	109	0	110	47	119	43	90
ITA	71	227	81	0	56	257	62	103
NLD	25	57	38	52	0	60	30	36
DEA	59	241	79	223	56	0	65	117
SVN	24	55	41	61	30	59	0	27
USA	122	231	61	76	28	82	23	0

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	0	112	62	118	39	138	71	21	16
CHE	96	0	115	391	58	231	301	46	14
FRA	56	84	0	137	44	75	108	32	13
ITA	99	332	109	0	83	196	293	59	15
NLD	32	56	38	67	0	56	61	23	10
USA	122	198	54	147	42	0	117	21	16
DEA	59	237	76	258	56	82	0	53	9
SVN	19	42	32	56	23	18	50	0	6
GBR	12	12	12	13	8	14	8	4	0

BSW
----

common bulls below diagonal
common three quarter sib group above diagonal

	CAN	CHE	FRA	ITA	NLD	USA	DEA	SVN	GBR
CAN	0	112	62	118	39	137	104	21	16
CHE	96	0	115	392	58	231	445	46	14

```
   FRA   56   84    0  137   44   75  140   32   13
   ITA   99  334  109    0   85  199  532   59   15
   NLD   32   56   38   67    0   56   79   23   10
   USA  121  198   54  147   42    0  212   21   16
   DEA   81  358  102  451   69  167    0   55   12
   SVN   19   42   32   56   23   18   52    0    6
   GBR   12   12   12   13    8   14   10    4    0
--------------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         CAN  CHE  FRA  ITA  NLD  USA  DEA  SVN  GBR
--------------------------------------------------------------------------------
   CAN    0  112   62  115   39  138  104   21   16
   CHE   96    0  115  391   58  231  445   46   14
   FRA   56   84    0  136   44   75  140   32   13
   ITA   97  333  109    0   84  187  527   59   15
   NLD   32   56   38   67    0   56   79   23   10
   USA  122  198   54  135   42    0  212   21   16
   DEA   81  358  102  445   69  167    0   55   12
   SVN   19   42   32   56   23   18   52    0    6
   GBR   12   12   12   13    8   14   10    4    0
--------------------------------------------------------------------------------
BSW
--------
BSW
--------
BSW
--------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         CAN  CHE  DEA  ITA  SVN  USA  FRA
--------------------------------------------------------------------------------
   CAN    0  112  103   80   21  145   44
   CHE   95    0  439  276   46  230   90
   DEA   82  355    0  298   55  208  109
   ITA   72  226  248    0   52  103   90
   SVN   19   42   52   50    0   21   32
   USA  122  198  166   76   18    0   54
   FRA   39   61   75   67   32   35    0
--------------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         CAN  CHE  DEA  ITA  SVN  FRA
--------------------------------------------------------------------------------
   CAN    0  119  105  122   28   75
   CHE   98    0  500  447   59  153
   DEA   82  407    0  537   74  171
   ITA  100  388  454    0   76  171
   SVN   25   57   69   75    0   44
   FRA   62  112  124  133   42    0
--------------------------------------------------------------------------------
BSW
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         CAN  CHE  DEA  ITA  SVN  USA  FRA
--------------------------------------------------------------------------------
   CAN    0  112   81   80   21  145   44
   CHE   95    0  336  276   46  230   90
   DEA   69  268    0  264   54  145  101
   ITA   72  226  230    0   52  103   90
   SVN   19   42   51   50    0   21   32
```

```
  USA  122  198  106   76   18    0   54
  FRA   39   61   70   67   32   35    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CHE  DEA  ITA  SVN  USA  FRA
----------------------------------------------------------------------------
  CHE    0  482  276   46  259  151
  DEA  392    0  297   55  199  167
  ITA  227  247    0   52  103  110
  SVN   42   52   50    0   21   32
  USA  231  155   76   18    0   89
  FRA  111  122   81   32   61    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  DEA  ITA  SVN  USA  FRA
----------------------------------------------------------------------------
  CAN    0   69   55   61   18   77   32
  CHE   59    0  336  276   42  230   90
  DEA   44  268    0  264   50  145  101
  ITA   55  226  230    0   45  103   90
  SVN   16   39   47   44    0   20   30
  USA   68  198  106   76   17    0   54
  FRA   27   61   70   67   30   35    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  CHE  DEA  ITA  SVN  FRA
----------------------------------------------------------------------------
  CAN    0  119  105  119   27   75
  CHE   98    0  500  441   57  153
  DEA   82  407    0  531   73  171
  ITA   98  383  447    0   74  170
  SVN   24   55   68   73    0   43
  FRA   62  112  124  133   41    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CHE  DEA  ITA  SVN  FRA
----------------------------------------------------------------------------
  CHE    0  499  443   45  150
  DEA  406    0  537   55  170
  ITA  385  454    0   58  169
  SVN   42   52   56    0   32
  FRA  111  123  133   32    0
----------------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CHE  DEA  ITA  SVN  FRA
----------------------------------------------------------------------------
  CHE    0  272  250   44  103
  DEA  226    0  255   53  118
  ITA  211  223    0   52  109
  SVN   41   50   50    0   32
  FRA   74   78   81   32    0
```

```
  ----------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
  ----------------------------------------------------------------------
  CHE    0  499  437   58  150
  DEA  406    0  531   73  170
  ITA  380  447    0   75  168
  SVN   56   68   74    0   43
  FRA  111  123  133   41    0
  ----------------------------------------------------------------------
BSW
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CHE  DEA  ITA  SVN  FRA
  ----------------------------------------------------------------------
  CHE    0  305  273   58   86
  DEA  240    0  256   65   97
  ITA  225  223    0   62   89
  SVN   56   59   61    0   35
  FRA   60   67   66   34    0
  ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
  ----------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
  ----------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
  ----------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  ----------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
  ----------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
```

```
  USA   52   73    0   22
  AUS   19    9   19    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   35   10
  USA   33    0    5
  AUS   11    4    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
  AUS   19    9   19    0
  --------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       CAN  GBR  USA  AUS
  --------------------------------------------------------------------------
  CAN    0   22   63   18
  GBR   19    0   74   11
  USA   52   73    0   22
```

```
 AUS   19    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  GBR  USA  AUS
 ----------------------------------------------------------------------------
 CAN    0   22   63   18
 GBR   19    0   74   11
 USA   52   73    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  GBR  USA  AUS
 ----------------------------------------------------------------------------
 CAN    0   22   63   18
 GBR   19    0   74   11
 USA   52   73    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  GBR  USA  AUS
 ----------------------------------------------------------------------------
 CAN    0   22   61   17
 GBR   19    0   74   11
 USA   51   73    0   22
 AUS   18    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  GBR  USA  AUS
 ----------------------------------------------------------------------------
 CAN    0   22   63   18
 GBR   19    0   74   11
 USA   52   73    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  GBR  USA  AUS
 ----------------------------------------------------------------------------
 CAN    0   22   63   18
 GBR   19    0   74   11
 USA   52   73    0   22
 AUS   19    9   19    0
 ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
         CAN  AUS  USA
 ----------------------------------------------------------------------------
 CAN    0    7   63
 AUS    8    0    9
 USA   52    8    0
```

```
    ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
    ----------------------------------------------------------------------------
    CAN    0   12   63   18
    GBR    9    0   33   11
    USA   52   31    0   22
    AUS   19    9   19    0
    ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
    ----------------------------------------------------------------------------
    CAN    0   20   61   17
    GBR   17    0   72   10
    USA   51   71    0   22
    AUS   18    8   19    0
    ----------------------------------------------------------------------------
GUE
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        CAN  GBR  USA  AUS
    ----------------------------------------------------------------------------
    CAN    0   20   63   21
    GBR   17    0   72   12
    USA   52   71    0   26
    AUS   20    9   22    0
    ----------------------------------------------------------------------------
GUE
--------
GUE
--------
HOL
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
    ----------------------------------------------------------------------------
    AUS    0  464  817  434  731  727  587  766  819  665  837  996  442  516  480  298  527  502   85  396  292  116  472
    BEL  400    0  604  491  778  631  544  721  684  648  969  715  389  520  273  243  401  497   84  384  236  144  489
    CAN  733  569    0  809 1681 1104 1206 1245 1429 1630 1231 2879  844 1009  359  375 1101 1006  131  416  616  174  845
    CHE  370  488  649    0  864  584  531  566  666  695  785  875  371  504  243  218  383  479   72  338  246  119  438
    DEU  396  657  636  580    0 1849 1250 1898 1544 2099 2130 2407  915 1440  398  351 1066 1444  185  518  479  260  868
    DFS  473  551  789  492  863    0  905 1386 1288 1303 1566 1607  704 1059  449  381  772 1027  141  520  410  199  750
    ESP  443  521  718  418  568  625    0 1044 1004 1211  994 1428  668  831  311  365  803  812  116  398  444  164  718
    FRA  459  655  689  465  646  585  674    0 1352 1446 1713 2180  770 1249  475  354 1054 1098  131  513  452  164  730
    GBR  678  688 1431  633  775  866  803  734    0 1462 1535 1933  746 1026  465  392  845  973  135  690  457  193  814
    ITA  527  633 1310  611 1041  974  869  702 1215    0 1515 2317  879 1250  361  362  979 1196  161  476  551  227  896
    NLD  685 1065 1061  740 1189 1122  829  857 1256 1233    0 2072  768 1205  577  378  865 1286  172  635  427  219  859
    USA  808  606 2812  760  864  974  889  970 1731 1700 1604    0 1097 1450  528  463 1624 1458  179  532  770  202 1074
    HUN  305  311  726  290  534  488  501  445  591  713  558  970    0  676  267  296  569  800  101  319  389  129  553
    POL  329  407  715  350  748  668  510  630  747  889  884 1154  505    0  299  286  695 1007  155  376  447  205  743
    NZL  383  211  306  201  242  284  252  231  364  285  512  441  201  184    0  206  310  318   40  332  172   60  284
    ZAF  274  205  348  188  247  295  333  248  362  314  339  487  248  209  186    0  304  300   48  234  221   73  308
    JPN  264  213  360  200  239  283  280  251  320  330  306  417  226  221  142  190    0  701  100  315  458  125  531
    CZE  316  367  666  331  838  577  540  622  675  849 1069 1050  668  671  206  220  206    0  123  384  436  191  680
    EST   40   51   58   33   88   66   49   48   63   78  101  105   59   82   17   21   22   67    0   60   64   51  101
    IRL  359  368  393  331  368  413  382  402  742  447  577  491  267  277  272  221  178  290   32    0  187   93  358
    KOR  204  162  548  170  226  266  305  222  338  454  280  857  307  323  118  172  208  303   26  132    0   90  400
    SVN   80  117  129   84  228  159  119  109  147  194  188  155   94  162   45   52   61  139   28   71   57    0  140
```

```
  PRT  356  488  847  379  589  639  679  574  747  857  847 1093  527  683  220  292  252  560   62  308  338  111    0
-------------------------------------------------------------------------------------
HOL
--------
common bulls below diagonal
common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
-------------------------------------------------------------------------------------
  AUS    0  457  817  434  731  726  598  624  819  665  782  996  442  514  480  248  526  502   85  396  290  116  475
  BEL  399    0  597  488  773  624  557  645  676  643  913  698  386  516  269  212  391  495   84  381  233  144  490
  CAN  733  569    0  809 1680 1104 1216 1069 1429 1630 1157 2879  844 1008  359  322 1099 1006  131  416  609  174  847
  CHE  370  487  649    0  864  584  539  515  666  695  762  875  371  502  243  195  382  479   72  338  244  119  439
  DEU  396  657  636  580    0 1849 1277 1761 1543 2099 2089 2407  915 1434  398  316 1064 1444  185  518  474  260  868
  DFS  473  550  789  492  863    0  929 1200 1286 1302 1487 1606  703 1054  448  327  771 1027  141  518  405  199  753
  ESP  452  547  727  427  600  647    0  966 1025 1230  984 1448  677  847  323  320  808  828  120  411  444  168  735
  FRA  413  608  630  426  573  552  670    0 1191 1382 1362 1733  716 1156  384  268  886 1041  128  453  410  163  691
  GBR  678  688 1431  633  775  866  832  680    0 1462 1468 1931  746 1024  465  336  843  973  135  687  453  193  816
  ITA  527  633 1310  611 1041  974  899  675 1215    0 1490 2317  879 1250  361  339  977 1196  161  476  543  227  897
  NLD  653 1003 1004  716 1167 1098  829  725 1202 1212    0 1836  747 1181  550  315  793 1267  170  621  404  219  843
  USA  808  605 2812  760  864  973  907  767 1731 1700 1360    0 1097 1448  528  394 1622 1458  179  530  761  202 1077
  HUN  305  311  726  290  534  488  510  428  591  713  541  970    0  675  267  268  569  800  101  319  384  129  556
  POL  329  407  715  350  748  668  527  587  746  889  873 1154  505    0  299  260  694 1007  155  376  443  205  745
  NZL  383  211  306  201  242  284  261  202  364  285  490  441  201  184    0  169  310  318   40  332  171   60  285
  ZAF  234  188  304  172  228  271  294  208  311  302  280  402  231  201  149    0  257  279   47  197  200   73  292
  JPN  261  209  356  197  236  280  278  240  314  327  297  411  175    0  700  141  175    0  700  100  315  453  125  532
  CZE  316  367  666  331  838  577  559  587  675  849 1052 1050  668  671  206  208  204    0  123  384  431  191  682
  EST   40   51   58   33   88   66   52   48   63   78  100  105   59   82   17   21   22   67    0   60   64   51  101
  IRL  359  368  393  331  368  413  399  371  740  447  563  491  267  277  272  190  177  290   32    0  184   93  359
  KOR  203  162  544  170  225  265  306  213  336  452  267  848  304  321  118  156  205  300   26  132    0   88  397
  SVN   80  117  129   84  228  159  125  109  147  194  186  155   94  162   45   52   61  139   28   71   56    0  140
  PRT  357  490  849  379  589  641  698  566  750  857  834 1093  531  686  220  282  248  562   62  309  336  111    0
-------------------------------------------------------------------------------------
HOL
--------
common bulls below diagonal
common three quarter sib group above diagonal
       AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN
-------------------------------------------------------------------------------------
  AUS    0  463  817  434  731  724  588  765  819  665  810  995  442  515  476  298  527  502   85  396  290  475   89
  BEL  400    0  604  491  778  630  549  721  684  648  945  715  389  520  273  243  401  497   84  384  234  491  112
  CAN  733  569    0  809 1681 1104 1210 1245 1429 1630 1200 2879  844 1009  359  375 1101 1006  131  416  612  847  148
  CHE  370  488  649    0  864  584  533  567  666  695  777  875  371  504  243  218  383  479   72  338  245  439   93
  DEU  396  657  636  580    0 1849 1256 1899 1544 2099 2116 2407  915 1440  398  351 1066 1444  185  518  476  868  225
  DFS  473  551  789  492  863    0  910 1385 1287 1302 1524 1606  703 1058  448  381  772 1027  141  519  407  754  166
  ESP  444  526  720  420  576  630    0 1049 1007 1216  985 1432  669  834  314  365  804  815  118  399  440  723  135
  FRA  459  655  689  466  647  585  680    0 1352 1446 1598 2180  770 1249  475  354 1054 1098  131  513  448  735  139
  GBR  678  688 1431  633  775  866  807  734    0 1462 1506 1932  746 1026  465  392  845  973  135  688  455  818  159
  ITA  527  633 1310  611 1041  974  876  702 1215    0 1507 2317  879 1250  361  362  979 1196  161  476  546  897  195
  NLD  681 1040 1054  739 1187 1121  833  835 1244 1232    0 1944  759 1196  564  368  831 1281  171  628  419  856  179
  USA  807  606 2812  760  864  973  892  970 1731 1700 1562    0 1097 1450  528  463 1624 1458  179  531  765 1077  170
  HUN  305  311  726  290  534  488  502  445  591  713  558  970    0  676  267  296  569  800  101  319  386  556  111
  POL  329  407  715  350  748  668  512  630  747  889  883 1154  505    0  299  286  695 1007  155  376  445  745  179
  NZL  383  211  306  201  242  284  254  231  364  285  510  441  201  184    0  206  310  318   40  332  171  285   49
  ZAF  274  205  348  188  247  295  334  248  362  314  337  487  248  209  186    0  304  300   48  234  220  308   54
  JPN  262  212  359  199  238  282  279  249  318  329  303  415  225  220  141  189    0  701  100  315  455  533  101
  CZE  316  367  666  331  838  577  542  622  675  849 1068 1050  668  671  206  220  205    0  123  384  434  562  162
  EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   17   21   22   67    0   60   64  101   47
  IRL  359  368  393  331  368  413  383  402  740  447  574  491  267  277  272  221  177  290   32    0  186  359   70
  KOR  203  162  546  170  226  266  304  221  338  453  277  852  306  322  118  171  207  302   26  132    0  399   76
  PRT  357  489  849  379  589  641  684  578  749  857  846 1093  530  686  220  292  251  562   62  309  337    0  113
  SVN   63   90  112   69  202  133   99   93  121  167  155  133   80  142   38   39   46  119   24   57   49   91    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
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           AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN
      -------------------------------------------------------------------------------------------------------------------
  AUS     0  450  817  419  729  726  602  624  816  664  420  993  441  511  295  526  502   83  394  290  467   89
  BEL   397    0  589  464  762  615  554  641  663  640  562  683  380  509  233  386  492   83  374  228  480  112
  CAN   733  564    0  773 1679 1100 1219 1068 1426 1629  777 2878  844 1007  371 1098 1006  130  415  610  841  146
  CHE   366  463  619    0  781  570  533  510  653  674  498  818  363  482  215  381  458   69  335  242  424   91
  DEU   395  655  636  527    0 1837 1285 1760 1541 2098 1274 2403  912 1430  347 1063 1443  184  517  474  852  224
  DFS   473  548  789  482  862    0  932 1194 1275 1297  868 1596  699 1044  378  768 1025  139  517  406  739  165
  ESP   455  549  729  425  616  655    0  972 1028 1235  640 1454  679  852  368  812  833  120  412  444  733  139
  FRA   413  608  630  421  573  552  681    0 1190 1381  776 1732  715 1154  299  886 1041  126  452  410  677  139
  GBR   678  679 1431  623  774  866  839  680    0 1459  832 1926  742 1015  387  842  972  132  679  453  802  158
  ITA   527  633 1309  595 1040  974  907  675 1214    0 1022 2316  879 1245  358  976 1196  159  475  543  885  194
  NLD   398  614  764  461  853  790  554  539  781  937    0  979  464  833  204  422  861  131  342  269  539  169
  USA   807  597 2811  705  863  973  910  767 1730 1699  847    0 1095 1446  458 1622 1457  178  527  761 1065  168
  HUN   305  309  726  285  534  488  514  428  590  713  346  969    0  673  294  569  800  101  316  384  550  111
  POL   329  404  715  330  748  666  537  587  743  887  702 1154  505    0  282  694 1004  154  373  443  736  179
  ZAF   271  203  345  184  244  292  334  215  359  311  180  483  247  206    0  301  296   46  232  217  304   52
  JPN   261  209  356  197  236  280  279  240  314  327  223  411  224  219  186    0  700  100  314  453  530  101
  CZE   316  367  666  319  838  577  565  587  675  849  820 1050  668  671  218  204    0  121  383  432  675  161
  EST    40   51   58   33   88   66   54   48   63   78   82  105   59   82   21   22   67    0   58   64   99   47
  IRL   359  366  393  327  367  413  402  371  733  447  343  491  267  276  219  177  290   32    0  184  352   70
  KOR   203  162  545  169  225  266  306  213  336  452  194  848  304  321  170  205  301   26  132    0  397   75
  PRT   357  486  849  369  588  638  699  566  748  855  547 1093  530  680  290  248  562   61  309  336    0  113
  SVN    63   90  111   68  201  132  102   93  121  166  153  132   80  142   37   46  119   24   57   49   91    0
      -------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
           AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
      -------------------------------------------------------------------------------------------------------------------
  AUS     0  464  817  434  731  727  586  766  819  665  837  996  442  516  480  298  527  502   85  396  292  116  475
  BEL   400    0  604  491  778  631  541  721  684  648  969  715  389  520  273  243  401  497   84  384  236  144  490
  CAN   733  569    0  809 1681 1104 1203 1245 1429 1630 1231 2879  844 1009  359  375 1101 1006  131  416  616  174  847
  CHE   370  488  649    0  864  584  529  566  666  695  785  875  371  504  243  218  383  479   72  338  246  119  439
  DEU   396  657  636  580    0 1849 1243 1898 1544 2099 2130 2407  915 1440  398  351 1066 1444  185  518  479  260  868
  DFS   473  551  789  492  863    0  899 1386 1288 1303 1566 1607  704 1059  449  381  772 1027  141  520  410  199  753
  ESP   442  518  716  416  560  620    0 1038  999 1205 1713  989  666  827  310  365  800  809  116  397  443  163  719
  FRA   459  655  689  465  646  584  667    0 1352 1446 1713 2180  770 1249  475  354 1054 1098  131  513  452  164  734
  GBR   678  688 1431  633  775  866  797  734    0 1462 1535 1933  746 1026  465  392  845  973  135  690  457  193  818
  ITA   527  633 1310  611 1041  974  863  702 1215    0 1515 2317  879 1250  361  362  979 1196  161  476  551  227  897
  NLD   685 1065 1061  740 1189 1122  823  857 1256 1233    0 2072  768 1205  577  378  865 1286  172  635  427  219  860
  USA   808  606 2812  760  864  973  883  970 1731 1700 1604    0 1097 1450  528  463 1624 1458  179  532  770  202 1076
  HUN   305  311  726  290  534  488  501  445  591  713  558  970    0  676  267  296  569  800  101  319  389  129  555
  POL   329  407  715  350  748  668  506  630  747  889  884 1154  505    0  299  286  695 1007  155  376  447  205  744
  NZL   383  211  306  201  242  284  251  231  364  285  512  441  201  184    0  206  310  318   40  332  172   60  285
  ZAF   274  205  348  188  247  295  333  248  362  314  339  487  248  209  186    0  304  300   48  234  221   73  308
  JPN   263  212  359  199  238  282  279  250  319  329  305  416  225  220  141  189    0  701  100  315  458  125  533
  CZE   316  367  666  331  838  577  537  622  675  849 1069 1050  668  671  206  220  206    0  123  384  436  191  682
  EST    40   51   58   33   88   66   49   48   63   78  101  105   59   82   17   21   22   67    0   60   64   51  101
  IRL   359  368  393  331  368  413  380  402  742  447  577  491  267  277  272  221  177  290   32    0  187   93  359
  KOR   204  162  548  170  226  266  303  222  338  454  280  857  307  323  118  172  208  303   26  132    0   90  400
  SVN    80  117  129   84  228  159  119  109  147  194  188  155   94  162   45   52   61  139   28   71   57    0  140
  PRT   357  488  849  379  589  640  678  577  749  857  848 1093  529  685  220  292  251  561   62  309  338  111    0
      -------------------------------------------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
           AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  PRT  SVN
      -------------------------------------------------------------------------------------------------------------------
  AUS     0  432  802  428  724  718  576  760  804  649  824  979  433  508  478  296  326  497   84  394  289  472   87
  BEL   392    0  583  484  758  610  524  674  653  639  880  668  374  508  258  231  291  483   84  369  226  483  112
  CAN   716  559    0  809 1681 1104 1204 1245 1429 1630 1228 2879  844 1009  359  375  797 1006  131  416  612  847  148
  CHE   365  484  649    0  864  584  529  567  666  695  783  875  371  504  243  218  301  479   72  338  244  439   93
  DEU   391  652  636  580    0 1849 1244 1899 1544 2099 2128 2407  915 1440  398  351  841 1444  185  518  476  868  225
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 DFS  467  546  789  492  863    0  901 1386 1288 1303 1558 1607  704 1059  449  381  544 1027  141  520  407  754  166
 ESP  436  512  718  416  562  622    0 1039 1001 1207  987 1424  667  828  310  365  620  810  116  397  440  720  134
 FRA  456  643  689  466  647  585  671    0 1352 1446 1702 2180  770 1249  475  354  717 1098  131  513  448  735  139
 GBR  665  671 1431  633  775  866  800  734    0 1462 1532 1933  746 1026  465  392  604  973  135  690  455  818  159
 ITA  514  633 1310  611 1041  974  866  702 1215    0 1514 2317  879 1250  361  362  839 1196  161  476  547  897  195
 NLD  675  968 1061  740 1188 1122  824  858 1255 1233    0 2065  768 1204  576  378  619 1286  171  634  422  861  179
 USA  790  591 2812  760  864  973  886  970 1731 1700 1601    0 1097 1450  528  463 1103 1458  179  532  764 1077  170
 HUN  302  307  726  290  534  488  501  445  591  713  558  970    0  676  267  296  451  800  101  319  386  556  111
 POL  323  404  715  350  748  668  508  630  747  889  884 1154  505    0  299  286  590 1007  155  376  444  745  179
 NZL  381  205  306  201  242  284  252  231  364  285  512  441  201  184    0  206  196  318   40  332  170  285   49
 ZAF  272  202  347  187  246  294  332  247  361  313  338  486  247  208  186    0  206  300   48  234  219  308   54
 JPN  220  184  319  180  216  252  236  270  304  262  357  197  210  117  144    0  558   88  227  371  419   98
 CZE  312  364  666  331  838  577  539  622  675  849 1069 1050  668  671  206  220  187    0  123  384  434  683  162
 EST   40   51   58   33   88   66   49   48   63   78  101  105   59   82   17   21   22   67    0   60   64  101   47
 IRL  358  362  393  331  368  413  381  402  742  447  577  491  267  277  272  220  153  290   32    0  185  359   70
 KOR  202  162  547  170  226  266  304  221  338  453  280  852  306  322  118  171  192  302   26  132    0  398   76
 PRT  355  486  849  379  589  641  680  578  749  857  849 1093  530  686  220  291  221  562   62  309  337    0  113
 SVN   63   90  112   69  202  133   98   93  121  167  155  133   80  142   38   39   46  119   24   57   49   91    0
     --------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
     --------------------------------------------------------------------------------
 AUS    0  464  817  434  731  727  590  766  819  665  837  996  442  516  480  298  526  502   85  396  290  116  475
 BEL  400    0  604  491  778  631  549  721  684  648  969  715  389  520  273  243  399  497   84  384  233  144  491
 CAN  733  569    0  809 1681 1104 1210 1245 1429 1630 1231 2879  844 1009  359  375 1099 1006  131  416  609  174  848
 CHE  370  488  649    0  864  584  533  566  666  695  785  875  371  504  243  218  382  479   72  338  244  119  439
 DEU  396  657  636  580    0 1849 1259 1898 1544 2099 2130 2407  915 1440  398  351 1064 1444  185  518  474  260  869
 DFS  473  551  789  492  863    0  913 1386 1288 1303 1566 1607  704 1059  449  381  771 1027  141  520  405  199  755
 ESP  445  527  720  421  579  632    0 1050 1009 1217 1001 1432  669  835  315  366  803  816  118  400  440  165  724
 FRA  459  655  689  465  646  585  682    0 1352 1446 1713 2180  770 1249  475  354 1052 1098  131  513  445  164  736
 GBR  678  688 1431  633  775  866  809  734    0 1462 1535 1933  746 1026  465  392  843  973  135  690  453  193  818
 ITA  527  633 1310  611 1041  974  878  702 1215    0 1515 2317  879 1250  361  362  977 1196  161  476  543  164  736
 NLD  685 1065 1061  740 1189 1122  837  857 1256 1233    0 2072  768 1205  577  378  863 1286  172  635  419  219  862
 USA  808  606 2812  760  864  974  893  970 1731 1700 1604    0 1097 1450  528  463 1622 1458  179  532  760  202 1078
 HUN  305  311  726  290  534  488  503  445  591  713  558  970    0  676  267  296  569  800  101  319  384  129  557
 POL  329  407  715  350  748  668  513  630  747  889  884 1154  505    0  299  286  695 1007  155  376  443  205  746
 NZL  383  211  306  201  242  284  255  231  364  285  512  441  201  184    0  206  310  318   40  332  171   60  285
 ZAF  274  205  348  188  247  295  335  248  362  314  339  487  248  209  186    0  303  300   48  234  219   73  308
 JPN  261  209  356  197  236  280  276  246  314  327  300  411  224  219  141  187    0  700  100  315  453  125  533
 CZE  316  367  666  331  838  577  544  622  675  849 1069 1050  668  671  206  220  204    0  123  384  431  191  683
 EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   17   21   22   67    0   60   64   51  101
 IRL  359  368  393  331  368  413  384  402  742  447  577  491  267  277  272  221  177  290   32    0  184   93  359
 KOR  203  162  544  170  225  265  303  219  336  452  276  847  304  321  118  171  205  300   26  132    0   88  396
 SVN   80  117  129   84  228  159  121  109  147  194  188  155   94  162   45   52   61  139   28   71   56    0  140
 PRT  357  490  849  379  589  641  687  578  751  859  851 1096  533  687  220  292  248  563   62  309  337  111    0
     --------------------------------------------------------------------------------
HOL
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common bulls below diagonal
common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
     --------------------------------------------------------------------------------
 AUS    0  412  703  419  698  673  544  485  753  646  704  880  419  460  246  463  377   83  372  204  113  458
 BEL  390    0  554  473  734  581  516  554  623  629  821  636  364  476  203  356  406   81  346  179  141  473
 CAN  655  548    0  774 1620 1008 1142  919 1335 1606 1093 2685  822  958  312  976  871  128  386  507  171  830
 CHE  367  474  634    0  864  583  535  476  666  695  752  875  369  479  196  374  401   72  329  196  116  435
 DEU  392  635  634  580    0 1848 1263 1554 1542 2099 2067 2406  911 1404  318 1038 1248  185  501  410  257  867
 DFS  468  537  786  492  863    0  909  988 1282 1301 1450 1605  699 1005  329  728  837  141  493  320  198  749
 ESP  436  514  709  422  585  637    0  843 1008 1223  951 1432  670  806  321  769  712  118  389  364  166  727
 FRA  354  525  560  392  536  497  585    0  983 1260 1166 1392  635 1083  227  734  863  117  370  331  156  611
 GBR  652  650 1358  632  775  864  816  580    0 1460 1419 1924  743  981  338  796  818  134  645  368  190  812
 ITA  523  628 1306  611 1041  974  885  624 1214    0 1485 2316  877 1225  340  963 1089  161  468  475  224  895
 NLD  614  906  984  711 1168 1093  802  664 1178 1215    0 1741  730 1131  311  761 1115  170  572  334  216  833
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USA  747  581 2699  760  864  973  896  636 1730 1700 1327    0 1094 1398  397 1490 1249  179  504  629  199 1071
HUN  300  298  720  290  534  488  505  385  590  713  544  970    0  649  269  554  684  101  305  330  127  556
POL  315  390  694  337  732  644  490  580  724  879  849 1124  487    0  247  659  903  154  339  396  202  724
ZAF  236  187  303  173  229  272  295  174  314  303  281  405  232  193    0  250  238   47  194  155   72  292
JPN  256  208  354  197  236  279  272  218  310  327  294  404  223  213  175    0  589   98  288  367  125  526
CZE  263  311  588  275  734  497  448  477  563  769  957  898  559  615  172  189    0  116  303  361  182  609
EST   40   50   58   33   88   66   50   44   63   78  100  105   59   81   21   22   62    0   58   59   51  101
IRL  350  353  390  328  366  411  386  313  708  445  547  485  265  264  191  176  235   32    0  131   92  345
KOR  144  138  456  144  194  222  241  194  262  392  221  695  256  299  114  173  256   24   98    0   80  340
SVN   79  114  128   83  226  159  122  105  146  192  185  154   93  161   52   61  135   28   71   54    0  139
PRT  354  480  828  376  590  639  690  521  748  858  829 1092  532  675  282  247  503   62  306  292  111    0
     ---------------------------------------------------------------------------
HOL
--------
common bulls below diagonal
common three quarter sib group above diagonal
     AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
     ---------------------------------------------------------------------------
AUS    0  437  817  434  480  725  598  761  819  665  801  996  441  515  298  526  502   85  395  290  115  479
BEL  397    0  581  483  589  606  541  666  651  638  873  667  374  507  231  377  483   84  368  226  144  486
CAN  733  559    0  809 1305 1104 1215 1229 1429 1630 1186 2879  843 1007  375 1099 1006  131  416  611  173  851
CHE  370  484  649    0  655  584  539  560  666  693  773  875  371  502  218  382  478   72  338  245  118  442
DEU  320  531  555  466    0 1258 1009 1300 1110 1717 1542 1729  691 1169  232  763 1085  160  358  385  237  666
DFS  473  546  789  492  726    0  928 1358 1286 1301 1511 1605  702 1056  381  771 1027  141  519  407  198  758
ESP  452  539  726  427  467  647    0 1055 1025 1229  998 1447  676  846  370  807  828  120  411  444  167  739
FRA  458  638  689  465  489  584  712    0 1337 1444 1543 2139  767 1240  353 1038 1093  129  507  442  163  737
GBR  678  671 1431  633  618  866  832  734    0 1462 1490 1930  745 1022  391  842  973  135  684  454  192  820
ITA  527  633 1310  610  880  974  898  702 1215    0 1499 2317  879 1248  362  977 1196  161  476  544  226  899
NLD  676  965 1048  738  953 1119  855  815 1235 1230    0 1901  752 1182  366  822 1276  171  621  415  218  855
USA  807  591 2812  760  693  973  906  934 1731 1700 1546    0 1096 1446  463 1621 1458  179  530  761  201 1079
HUN  305  307  726  290  412  487  510  445  591  713  556  970    0  675  295  569  799  101  318  384  128  557
POL  329  404  715  349  652  666  526  630  746  889  876 1154  504    0  285  695 1004  154  374  443  203  746
ZAF  274  203  348  188  166  295  337  248  362  314  333  487  248  209    0  302  300   48  234  220   73  312
JPN  261  209  356  197  203  280  277  245  313  327  297  410  224  219  186    0  700  100  315  454  124  536
CZE  316  364  666  331  664  577  559  622  675  849 1067 1050  668  671  220  204    0  122  384  433  190  683
EST   40   51   58   33   75   66   52   48   63   78  101  105   59   81   21   22   67    0   60   64   51  100
IRL  359  362  393  331  283  413  399  402  736  447  573  491  267  277  221  177  290   32    0  185   92  360
KOR  203  162  545  170  199  266  304  219  337  452  274  843  304  321  171  205  302   26  132    0   89  399
SVN   80  117  129   84  217  158  125  109  147  194  188  155   94  161   52   61  139   28   71   56    0  139
PRT  359  490  852  382  494  644  703  580  755  860  849 1100  535  689  293  248  565   61  310  338  111    0
     ---------------------------------------------------------------------------
HOL
--------
common bulls below diagonal
common three quarter sib group above diagonal
     AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
     ---------------------------------------------------------------------------
AUS    0  457  817  434  731  726  598  715  819  665  782  996  442  515  480  298  526  502   85  396  291  116  475
BEL  399    0  599  490  774  626  559  696  678  645  915  700  386  517  269  241  392  495   84  382  235  144  491
CAN  733  569    0  809 1680 1104 1215 1167 1429 1630 1157 2879  844 1009  359  375 1099 1006  131  416  615  173  848
CHE  370  487  649    0  864  584  539  559  666  695  762  875  371  504  243  218  382  479   72  338  245  119  439
DEU  396  657  636  580    0 1849 1276 1880 1544 2099 2090 2407  915 1439  398  351 1064 1444  185  518  478  260  869
DFS  473  550  789  492  863    0  928 1307 1287 1302 1487 1606  703 1058  448  381  771 1027  141  519  409  199  755
ESP  452  547  726  427  600  647    0 1029 1026 1229  985 1447  677  848  323  370  808  828  120  411  447  168  735
FRA  457  651  686  465  645  582  712    0 1297 1437 1508 1980  756 1238  442  339  974 1086  130  495  433  164  728
GBR  678  688 1431  633  775  866  832  729    0 1462 1469 1932  746 1026  465  392  843  973  135  688  456  193  818
ITA  527  633 1310  611 1041  974  898  701 1215    0 1490 2317  879 1250  361  362  977 1196  161  476  550  226  898
NLD  653 1003 1005  716 1167 1097  829  804 1203 1212    0 1838  747 1183  550  359  793 1267  170  621  409  218  855
USA  808  605 2812  760  864  974  906  899 1731 1700 1360    0 1097 1450  528  463 1622 1458  179  531  768  201 1078
HUN  305  311  726  290  534  488  510  444  591  713  541  970    0  676  267  296  569  800  101  319  389  129  557
POL  329  407  715  350  748  668  527  630  747  889  875 1154  505    0  299  286  695 1007  155  376  447  205  746
NZL  383  211  306  201  242  284  261  229  364  285  490  441  201  184    0  206  310  318   40  332  171   60  285
ZAF  274  205  348  188  247  295  337  246  362  314  319  487  248  209  186    0  303  300   48  234  220   73  308
JPN  261  209  356  197  236  280  278  246  314  327  297  411  224  219  141  187    0  700  100  315  456  125  533
CZE  316  367  666  331  838  577  559  620  675  849 1052 1050  668  671  206  220  204    0  123  384  436  191  683
EST   40   51   58   33   88   66   52   48   63   78  100  105   59   82   17   21   22   67    0   60   64   51  101
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 IRL  359  368  393  331  368  413  399  400  740  447  562  491  267  277  272  221  177  290   32    0  186   93  359
 KOR  204  162  547  170  226  266  307  221  338  454  270  853  307  323  118  171  206  303   26  132    0   90  400
 SVN   80  117  128   84  228  159  125  109  147  193  185  154   94  162   45   52   61  139   28   71   57    0  140
 PRT  357  490  849  379  589  641  698  576  750  858  835 1094  532  687  220  292  248  562   62  309  338  111    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
 ------------------------------------------------------------------------------
 AUS    0  457  817  434  731  680  591  762  819  665  811  996  442  516  480  298  527  502   85  396  291  116  474
 BEL  399    0  599  490  774  615  548  707  678  645  930  700  386  517  269  241  393  495   84  382  235  144  490
 CAN  733  569    0  809 1681 1026 1211 1230 1429 1630 1200 2879  844 1009  359  375 1100 1006  131  416  615  174  845
 CHE  370  487  649    0  864  565  535  564  666  695  777  875  371  504  243  218  382  479   72  338  245  119  439
 DEU  396  657  636  580    0 1798 1261 1894 1544 2099 2116 2407  915 1440  398  351 1065 1444  185  518  478  260  866
 DFS  473  550  789  492  863    0  872 1276 1229 1289 1490 1513  687 1038  421  354  718  994  139  502  396  199  744
 ESP  445  528  721  422  580  633    0 1040 1011 1218  988 1434  670  837  316  368  805  817  118  401  444  165  723
 FRA  459  654  689  465  645  584  684    0 1339 1444 1591 2141  768 1246  471  353 1040 1093  130  508  447  164  731
 GBR  678  687 1430  633  774  865  808  733    0 1462 1506 1932  746 1026  465  392  844  973  135  688  456  193  816
 ITA  527  633 1310  611 1041  973  879  702 1214    0 1507 2317  879 1250  361  362  978 1196  161  476  550  227  896
 NLD  681 1035 1054  739 1187 1121  836  833 1243 1232    0 1944  759 1196  564  368  830 1281  171  628  421  193  816
 USA  808  605 2812  760  864  973  894  935 1731 1700 1562    0 1097 1450  528  463 1623 1458  179  531  769  202 1075
 HUN  305  311  726  290  534  488  504  445  591  713  558  970    0  676  267  296  569  800  101  319  389  129  556
 POL  329  407  715  350  748  668  515  630  747  889  883 1154  505    0  299  286  695 1007  155  376  447  205  743
 NZL  383  211  306  201  242  284  255  231  364  285  510  441  201  184    0  206  310  318   40  332  171   60  285
 ZAF  274  205  348  188  247  295  336  248  362  314  337  487  248  209  186    0  304  300   48  234  220   73  307
 JPN  261  210  357  197  237  281  278  247  315  328  300  412  224  219  141  188    0  701  100  315  457  125  533
 CZE  316  367  666  331  838  577  545  622  675  849 1068 1050  668  671  206  220  204    0  123  384  436  191  682
 EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   17   21   22   67    0   60   64   51  100
 IRL  359  368  393  331  368  413  385  402  740  447  574  491  267  277  272  221  177  290   32    0  186   93  359
 KOR  204  162  548  170  226  266  306  222  338  454  277  854  307  323  118  172  207  303   26  132    0   90  400
 SVN   80  117  129   84  228  159  121  109  147  194  188  155   94  162   45   52   61  139   28   71   57    0  140
 PRT  357  489  849  379  589  638  686  578  749  857  846 1093  530  686  220  292  249  562   62  309  338  111    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal
      AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  ZAF  JPN  CZE  EST  IRL  KOR  SVN  PRT
 ------------------------------------------------------------------------------
 AUS    0  457  817  434  731  727  601  766  819  665  837  996  442  516  480  298  526  502   85  396  290  116  475
 BEL  399    0  599  490  774  627  561  710  678  645  938  700  386  517  269  241  392  495   84  382  233  144  491
 CAN  733  569    0  809 1681 1104 1218 1245 1429 1630 1231 2879  844 1009  359  375 1099 1006  131  416  609  174  848
 CHE  370  487  649    0  864  584  539  566  666  695  785  875  371  504  243  218  382  479   72  338  244  119  439
 DEU  396  657  636  580    0 1849 1285 1898 1544 2099 2130 2407  915 1440  398  351 1064 1444  185  518  474  260  869
 DFS  473  550  790  492  863    0  935 1386 1288 1303 1566 1607  704 1059  449  381  771 1027  141  520  405  199  755
 ESP  453  550  728  427  614  654    0 1074 1030 1234 1030 1453  679  855  325  370  811  832  121  413  444  168  739
 FRA  459  654  689  465  646  585  725    0 1352 1446 1713 2180  770 1249  475  354 1052 1098  131  513  445  164  736
 GBR  678  688 1431  633  775  866  838  734    0 1462 1535 1933  746 1026  465  392  843  973  135  690  453  193  818
 ITA  527  633 1310  611 1041  974  906  702 1215    0 1515 2317  879 1250  361  362  977 1196  161  476  543  227  898
 NLD  685 1042 1061  740 1189 1122  872  857 1256 1233    0 2072  768 1205  577  378  863 1286  172  635  419  219  862
 USA  808  605 2812  760  864  975  909  970 1731 1700 1604    0 1097 1450  528  463 1622 1458  179  532  759  202 1078
 HUN  305  311  726  290  534  489  513  445  591  713  558  970    0  676  267  296  569  800  101  319  384  129  557
 POL  329  407  715  350  748  668  535  630  747  889  884 1154  505    0  299  286  695 1007  155  376  443  205  746
 NZL  383  211  306  201  242  284  262  231  364  285  512  441  201  184    0  206  310  318   40  332  171   60  285
 ZAF  274  205  348  188  247  296  337  248  362  314  339  487  248  209  186    0  303  300   48  234  219   73  308
 JPN  261  209  356  197  236  280  278  246  314  327  300  411  224  219  141  187    0  700  100  315  453  125  533
 CZE  316  367  666  331  838  577  562  622  675  849 1069 1050  668  671  206  220  204    0  123  384  431  191  683
 EST   40   51   58   33   88   66   53   48   63   78  101  105   59   82   17   21   22   67    0   60   64   51  101
 IRL  359  368  393  331  368  413  401  402  742  447  577  491  267  277  272  221  177  290   32    0  184   93  359
 KOR  203  162  544  170  225  265  305  219  336  452  276  846  304  321  118  171  205  300   26  132    0   88  396
 SVN   80  117  129   84  228  159  125  109  147  194  188  155   94  162   45   52   61  139   28   71   56    0  140
 PRT  357  490  849  379  589  641  701  578  751  859  851 1096  533  687  220  292  248  563   62  309  337  111    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0	460	817	434	731	726	588	766	819	665	837	996	442	516	298	527	502	85	395	290	116	475
BEL	398	0	599	489	772	626	544	714	678	647	961	709	386	517	240	397	495	84	379	232	144	490
CAN	733	565	0	809	1681	1104	1208	1245	1429	1630	1231	2879	844	1009	375	1101	1006	131	416	613	174	847
CHE	370	486	649	0	864	584	532	566	666	695	785	875	371	504	218	383	479	72	338	245	119	439
DEU	396	656	636	580	0	1849	1251	1898	1544	2099	2130	2407	915	1440	351	1066	1444	185	518	477	260	868
DFS	473	550	790	492	863	0	907	1386	1288	1303	1566	1607	704	1059	381	772	1027	141	520	408	199	754
ESP	443	520	718	418	570	626	0	1044	1006	1212	996	1428	669	833	365	803	814	118	399	441	164	723
FRA	459	653	689	465	646	585	674	0	1352	1446	1713	2180	770	1249	354	1054	1098	131	513	449	164	735
GBR	678	684	1431	633	775	866	804	734	0	1462	1535	1933	746	1026	392	845	973	135	687	456	193	818
ITA	527	633	1310	611	1041	974	870	702	1215	0	1515	2317	879	1250	362	979	1196	161	476	548	227	897
NLD	685	1054	1061	740	1189	1122	830	857	1256	1233	0	2072	768	1205	378	865	1286	172	635	424	219	861
USA	807	602	2812	760	864	975	889	970	1731	1700	1604	0	1097	1450	463	1624	1458	179	532	766	202	1077
HUN	305	310	726	290	534	489	502	445	591	713	558	970	0	676	296	569	800	101	319	387	129	556
POL	329	407	715	350	748	668	511	630	747	889	884	1154	505	0	286	695	1007	155	376	445	205	745
ZAF	274	205	348	188	247	296	333	248	362	314	339	487	248	209	0	304	300	48	234	220	73	308
JPN	263	212	359	199	238	282	279	250	319	329	305	416	225	220	189	0	701	100	315	456	125	533
CZE	316	367	666	331	838	577	541	622	675	849	1069	1050	668	671	220	206	0	123	384	435	191	683
EST	40	51	58	33	88	66	50	48	63	78	101	105	59	82	21	22	67	0	60	64	51	101
IRL	359	367	393	331	368	413	382	402	739	447	577	491	267	277	221	177	290	32	0	186	93	359
KOR	203	162	547	170	226	266	304	221	338	453	280	853	306	322	172	207	302	26	132	0	89	399
SVN	80	117	129	84	228	159	119	109	147	194	188	155	94	162	52	61	139	28	71	56	0	140
PRT	357	488	849	379	589	641	683	578	749	857	849	1093	530	686	292	251	562	62	309	337	111	0

HOL

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0	457	817	434	731	727	591	766	819	665	837	996	442	516	480	298	527	502	85	396	291	114	475
BEL	399	0	599	490	774	627	548	710	678	645	938	700	386	517	269	241	394	495	84	382	235	142	491
CAN	733	569	0	809	1681	1104	1210	1245	1429	1630	1231	2879	844	1009	359	375	1101	1006	131	416	615	170	847
CHE	370	487	649	0	864	584	534	566	666	695	785	875	371	504	243	218	383	479	72	338	245	116	439
DEU	396	657	636	580	0	1849	1260	1898	1544	2099	2130	2407	915	1440	398	351	1066	1444	185	518	478	257	868
DFS	473	550	790	492	863	0	913	1386	1288	1303	1566	1607	704	1059	449	381	772	1027	141	520	409	197	754
ESP	445	528	720	421	579	632	0	1051	1010	1217	1002	1433	669	836	316	367	804	816	118	400	443	164	724
FRA	459	654	689	465	646	585	683	0	1352	1446	1713	2180	770	1249	475	354	1054	1098	131	513	451	162	735
GBR	678	688	1431	633	775	866	809	734	0	1462	1535	1933	746	1026	465	392	845	973	135	690	456	190	818
ITA	527	633	1310	611	1041	974	878	702	1215	0	1515	2317	879	1250	361	362	979	1196	161	476	550	224	897
NLD	685	1042	1061	740	1189	1122	837	857	1256	1233	0	2072	768	1205	577	378	865	1286	172	635	426	215	861
USA	808	605	2812	760	864	974	893	970	1731	1700	1604	0	1097	1450	528	463	1624	1458	179	532	769	198	1077
HUN	305	311	726	290	534	489	503	445	591	713	558	970	0	676	267	296	569	800	101	319	389	127	556
POL	329	407	715	350	748	668	514	630	747	889	884	1154	505	0	299	286	695	1007	155	376	447	203	745
NZL	383	211	306	201	242	284	255	231	364	285	512	441	201	184	0	206	310	318	40	332	171	60	285
ZAF	274	205	348	188	247	296	335	248	362	314	339	487	248	209	186	0	304	300	48	234	220	72	308
JPN	262	212	359	199	238	282	279	249	318	329	304	415	225	220	141	189	0	701	100	315	457	124	533
CZE	316	367	666	331	838	577	544	622	675	849	1069	1050	668	671	206	220	205	0	123	384	436	188	683
EST	40	51	58	33	88	66	50	48	63	78	101	105	59	82	17	21	22	67	0	60	64	50	101
IRL	359	368	393	331	368	413	384	402	742	447	577	491	267	277	272	221	177	290	32	0	186	92	359
KOR	204	162	548	170	226	266	305	222	338	454	280	854	307	323	118	172	208	303	26	132	0	89	400
SVN	80	116	128	84	226	158	121	109	147	192	186	153	93	161	45	52	61	139	28	71	57	0	139
PRT	357	489	849	379	589	641	685	578	749	857	849	1093	530	686	220	292	251	562	62	309	338	111	0

HOL

common bulls below diagonal
common three quarter sib group above diagonal

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	ZAF	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0	464	817	434	731	726	588	766	819	665	837	996	430	516	298	519	502	85	395	292	114	475
BEL	400	0	604	491	778	631	547	721	684	648	969	715	382	520	243	400	497	84	384	236	142	491

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CAN  733  569    0  809 1681 1104 1209 1245 1429 1630 1231 2879  830 1009  375 1093 1006  131  416  616  170  847
CHE  370  488  649    0  864  584  533  566  666  695  785  875  366  504  218  383  479   72  338  246  116  439
DEU  396  657  636  580    0 1849 1252 1898 1544 2099 2130 2407  906 1440  351 1064 1444  185  518  479  257  868
DFS  473  551  790  492  863    0  908 1386 1288 1303 1566 1607  690 1059  381  766 1027  141  520  410  197  754
ESP  443  523  719  419  572  627    0 1045 1006 1213  997 1429  660  834  365  793  815  118  399  444  163  723
FRA  459  655  689  465  646  585  675    0 1352 1446 1713 2180  753 1249  354 1041 1098  131  513  452  162  735
GBR  678  688 1431  633  775  866  805  734    0 1462 1535 1933  732 1026  392  840  973  135  687  457  190  818
ITA  527  633 1310  611 1041  974  872  702 1215    0 1515 2317  876 1250  362  977 1196  161  476  551  224  897
NLD  685 1065 1061  740 1189 1122  832  857 1256 1233    0 2072  751 1205  378  859 1286  172  635  427  215  861
USA  807  606 2812  760  864  975  890  970 1731 1700 1604    0 1068 1450  463 1604 1458  179  532  770  198 1077
HUN  293  302  712  286  527  480  488  437  575  708  545  944    0  671  288  560  788  101  313  388  127  554
POL  329  407  715  350  748  668  512  630  747  889  884 1154  501    0  286  693 1007  155  376  447  203  745
ZAF  274  205  348  188  247  296  333  248  362  314  339  487  237  209    0  301  300   48  234  221   72  308
JPN  262  212  359  199  238  282  279  249  318  329  304  415  219  220  189    0  700   99  313  458  124  533
CZE  316  367  666  331  838  577  542  622  675  849 1069 1050  657  671  220  205    0  123  384  436  188  683
EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   21   22   67    0   60   64   50  101
IRL  359  368  393  331  368  413  383  402  739  447  577  491  259  277  221  177  290   32    0  187   92  359
KOR  204  162  548  170  226  266  305  222  338  454  280  857  305  323  172  208  303   26  132    0   89  400
SVN   80  116  128   84  226  158  119  109  147  192  186  153   93  161   52   61  139   28   71   57    0  139
PRT  357  489  849  379  589  641  684  578  749  857  849 1093  527  686  292  251  562   62  309  338  111    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	POL	NZL	JPN	CZE	EST	IRL	KOR	SVN	PRT	ZAF	HUN
AUS	0	414	671	392	640	555	514	617	645	612	626	659	388	394	313	361	79	318	170	111	371	157	278
BEL	389	0	591	465	762	571	549	695	598	641	823	596	432	264	292	411	84	322	154	142	419	141	274
CAN	633	564	0	773	1675	947	1211	1243	1249	1627	1079	2466	904	353	797	875	130	350	434	170	728	223	672
CHE	359	463	619	0	781	521	529	552	612	674	658	763	418	237	300	388	71	291	169	114	371	130	277
DEU	384	655	635	528	0	1708	1263	1874	1389	2097	1989	2097	1312	391	841	1245	184	447	351	257	760	209	702
DFS	427	512	759	450	830	0	809	1156	1044	1245	1346	1211	901	360	531	812	135	406	263	193	629	209	499
ESP	417	532	722	419	584	584	0	1057	901	1221	906	1263	739	317	623	711	117	331	312	165	629	216	509
FRA	423	651	689	456	631	546	693	0	1068	1442	1315	1484	1087	465	717	916	129	399	304	162	611	188	564
GBR	579	622	1273	577	723	762	701	626	0	1389	1237	1559	881	357	589	792	124	496	306	188	675	218	532
ITA	513	633	1309	595	1041	931	885	702	1159	0	1453	2152	1161	355	839	1089	160	428	402	224	800	238	723
NLD	562	898	945	627	1132	1024	761	740	1024	1192	0	1462	1044	452	610	1098	166	498	280	212	710	207	554
USA	618	566	2540	679	812	874	787	704	1510	1653	1158	0	1254	354	1064	1199	169	406	526	195	872	253	798
POL	274	343	656	286	660	588	423	544	653	820	776	1033	0	220	568	871	143	292	345	193	643	183	533
NZL	327	209	304	198	241	253	257	231	296	284	413	312	140	0	194	227	39	267	102	59	217	102	147
JPN	222	184	319	180	216	251	237	219	270	304	262	357	197	117	0	531	87	210	299	112	397	159	396
CZE	256	311	588	266	733	493	448	493	556	769	882	595	156	183	62	0	115	290	307	181	573	199	600
EST	40	51	58	33	88	63	50	48	60	78	97	102	73	17	22	62	0	53	55	50	93	40	89
IRL	311	329	350	294	341	352	332	336	512	411	481	416	225	229	153	233	32	0	105	90	287	123	209
KOR	130	119	391	126	167	188	201	167	219	331	187	592	265	77	150	216	23	80	0	76	274	117	263
SVN	79	116	128	83	226	156	122	109	145	192	185	153	151	45	57	135	28	71	51	0	133	63	118
PRT	296	412	706	313	511	529	565	480	605	760	692	886	600	168	208	473	57	250	240	105	0	197	408
ZAF	151	126	205	108	144	181	186	149	192	202	178	254	152	92	117	148	19	115	82	45	187	0	166
HUN	210	217	586	217	401	361	350	336	413	568	397	718	411	110	173	499	52	182	205	86	397	142	0

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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

	AUS	BEL	CAN	CHE	DEU	DFS	ESP	FRA	GBR	ITA	NLD	USA	HUN	POL	NZL	JPN	CZE	EST	IRL	KOR	SVN	PRT
AUS	0	464	817	434	731	727	588	643	819	665	837	993	442	515	480	527	502	85	396	292	89	475
BEL	400	0	602	489	777	629	551	665	682	646	967	710	389	519	273	400	497	84	383	236	112	490
CAN	733	569	0	809	1681	1104	1201	1086	1429	1630	1231	2864	844	1008	359	1101	1006	131	416	618	147	847
CHE	370	488	649	0	864	584	535	531	666	695	785	871	371	502	243	383	479	72	338	246	92	439
DEU	396	656	636	580	0	1849	1263	1781	1544	2099	2130	2400	915	1436	398	1066	1444	185	518	479	223	868
DFS	473	551	790	492	863	0	912	1223	1288	1303	1566	1605	704	1056	449	772	1027	141	519	411	164	753
ESP	447	534	722	422	586	637	0	978	1012	1223	1009	1429	673	841	321	801	821	118	405	446	136	731
FRA	442	629	656	451	598	577	685	0	1215	1397	1432	1755	725	1167	396	900	1052	128	468	423	139	695
GBR	678	688	1431	633	775	866	817	722	0	1462	1535	1927	746	1025	465	845	973	135	689	457	158	816

```
ITA  527  633 1310  611 1041  974  885  694 1215    0 1515 2311  879 1250  361  979 1196  161  476  552  194  897
NLD  685 1065 1061  740 1189 1122  847  788 1256 1233    0 2066  768 1203  577  865 1286  172  635  427  177  861
USA  805  604 2788  755  857  972  893  812 1723 1693 1597    0 1094 1445  527 1620 1453  178  529  772  169 1074
HUN  305  311  726  290  534  489  505  442  591  713  558  968    0  675  267  569  800  101  319  389  111  556
POL  329  407  715  350  748  668  518  598  747  889  884 1150  505    0  299  694 1007  155  376  447  179  745
NZL  383  211  306  201  242  284  258  225  364  285  512  439  201  184    0  310  318   40  332  173   49  285
JPN  262  211  358  199  238  282  279  249  318  329  304  415  225  220  141    0  701  100  315  459  101  533
CZE  316  367  666  331  838  577  549  606  675  849 1069 1045  668  671  206  206    0  123  384  436  160  682
EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   17   22   67    0   60   64   47  101
IRL  359  368  393  331  368  413  390  398  742  447  577  490  267  277  272  177  290   32    0  187   70  359
KOR  204  162  548  170  226  266  307  219  338  454  280  857  307  323  118  208  303   26  132    0   77  400
SVN   63   90  112   69  200  131  100   93  121  166  154  133   80  142   38   46  118   24   57   50    0  113
PRT  357  489  849  379  589  641  691  569  749  857  849 1086  530  686  220  250  562   62  309  338   91    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

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     AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  NZL  JPN  CZE  EST  IRL  SVN  PRT
---------------------------------------------------------------------------------------------------------
AUS    0  464  817  434  731  727  594  766  819  665  837  996  442  516  480  527  502   85  383   89  475
BEL  400    0  604  491  778  631  555  721  684  648  969  715  389  520  273  401  497   84  372  112  491
CAN  733  569    0  809 1681 1104 1212 1245 1429 1630 1231 2879  844 1009  359 1101 1006  131  402  146  847
CHE  370  488  649    0  864  584  536  566  666  695  785  875  371  504  243  383  479   72  329   93  439
DEU  396  657  636  580    0 1849 1266 1898 1544 2099 2130 2406  915 1440  398 1066 1444  185  501  224  868
DFS  473  551  790  492  863    0  919 1386 1288 1303 1566 1607  704 1059  449  772 1027  141  496  165  754
ESP  447  534  722  422  586  637    0 1059 1018 1223 1012 1439  673  843  322  807  822  118  392  136  731
FRA  459  655  689  465  646  585  693    0 1352 1446 1713 2180  770 1249  475 1054 1098  131  484  139  735
GBR  678  686 1430  633  773  865  814  733    0 1462 1535 1933  746 1026  465  845  973  135  652  159  818
ITA  527  633 1310  611 1041  974  885  702 1213    0 1515 2316  879 1250  361  979 1196  161  468  194  897
NLD  685 1065 1061  740 1189 1122  847  857 1254 1233    0 2071  768 1205  577  865 1286  172  599  177  861
USA  808  606 2812  760  863  975  899  970 1731 1700 1603    0 1097 1449  528 1624 1457  179  506  168 1077
HUN  305  311  726  290  534  489  505  445  591  713  558  970    0  676  267  569  800  101  308  111  556
POL  329  407  715  350  748  668  518  630  747  889  884 1154  505    0  299  695 1007  155  365  180  745
NZL  383  211  306  201  242  284  259  231  364  285  512  441  201  184    0  310  318   40  318   49  285
JPN  262  211  358  199  238  282  279  250  318  329  304  415  225  220  141    0  701  100  301  101  533
CZE  316  367  666  331  838  577  549  622  674  849 1069 1050  668  671  206  206    0  123  369  161  683
EST   40   51   58   33   88   66   50   48   63   78  101  105   59   82   17   22   67    0   59   47  101
IRL  357  367  392  329  366  412  387  397  718  445  569  485  265  277  268  177  289   32    0   70  348
SVN   63   90  111   69  200  131  100   93  121  166  154  131   80  142   38   46  118   24   57    0  113
PRT  357  490  849  379  589  641  692  578  749  857  850 1093  531  686  220  250  562   62  309   91    0
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HOL
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common bulls below diagonal
common three quarter sib group above diagonal

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     AUS  BEL  CAN  CHE  DEU  DFS  ESP  FRA  GBR  ITA  NLD  USA  HUN  POL  JPN  CZE  EST  IRL  SVN  PRT
----------------------------------------------------------------------------------------------------
AUS    0  417  742  394  680  671  528  581  740  599  746  908  396  467  479  470   75  358   75  444
BEL  345    0  596  486  771  624  552  645  675  642  920  693  378  514  387  494   84  369  112  492
CAN  650  568    0  809 1681 1104 1213 1069 1429 1630 1200 2871  830 1008 1084 1006  131  402  147  854
CHE  318  485  649    0  864  584  537  515  666  695  774  872  366  502  381  479   72  329   92  444
DEU  340  656  636  580    0 1849 1269 1761 1544 2099 2107 2407  906 1435 1061 1444  185  501  223  875
DFS  405  549  790  492  863    0  922 1201 1288 1303 1538 1593  690 1056  761 1027  141  496  164  761
ESP  379  539  723  424  590  641    0  960 1019 1226  997 1438  664  844  796  823  119  393  136  739
FRA  366  608  630  426  573  552  656    0 1192 1382 1386 1726  711 1157  880 1041  128  443  139  695
GBR  579  685 1430  633  773  865  819  679    0 1462 1510 1926  732 1025  833  973  135  649  158  822
ITA  436  633 1310  611 1041  974  890  675 1213    0 1501 2314  876 1250  975 1196  161  468  194  901
NLD  563 1006 1014  718 1169 1099  823  727 1216 1213    0 1962  744 1192  827 1275  171  593  177  857
USA  687  601 2812  760  864  975  899  767 1730 1700 1394    0 1068 1448 1571 1456  179  504  169 1084
HUN  255  302  712  286  527  480  492  424  575  708  529  944    0  670  559  788  101  303  111  557
POL  280  406  715  350  748  668  520  587  747  889  876 1154  501    0  692 1007  155  365  179  750
JPN  234  210  357  197  237  281  279  241  315  328  299  412  218  219    0  698   99  297  101  537
CZE  276  366  666  331  838  577  551  587  674  849 1052 1049  657  671  204    0  123  369  160  685
EST   34   51   58   33   88   66   51   48   63   78  100  105   59   82   22   67    0   59   47  101
IRL  324  367  392  329  366  412  389  369  715  445  559  485  258  277  177  289   32    0   70  350
```

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   SVN    54    90   112    69   200   131   100    93   121   166   154   133    80   142    46   118    24    57     0   113
   PRT   319   493   852   383   593   647   701   570   756   860   841  1099   532   691   249   566    62   310    91     0
   ----------------------------------------------------------------------------
HOL
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
         BEL   CAN   CHE   DEU   DFS   ESP   FRA   GBR   ITA   NLD   USA   CZE   IRL   KOR   SVN   PRT   EST   HUN
   ----------------------------------------------------------------------------
   BEL     0   551   393   617   577   493   605   620   507   765   635   397   344   140    93   407    49   272
   CAN   548     0   663  1365  1008  1099  1039  1333  1365  1010  2682   854   386   374   125   713    80   671
   CHE   396   540     0   633   466   434   444   547   547   571   698   356   264   149    74   342    49   268
   DEU   549   570   437     0  1405  1050  1390  1202  1462  1628  1875  1109   390   292   171   651   120   663
   DFS   533   787   404   761     0   830  1196  1276   942  1304  1586   819   493   233   136   624    86   504
   ESP   489   654   327   480   592     0   906   918   971   855  1309   696   354   274   114   611    76   505
   FRA   590   628   362   492   552   633     0  1190   988  1191  1725   884   442   267   116   591    78   564
   GBR   649  1357   502   645   863   715   680     0  1118  1244  1917   801   644   267   131   681    85   539
   ITA   515  1148   485   748   771   683   569   965     0  1073  1746   884   343   336   153   673   104   657
   NLD   836   911   537   982  1017   696   685  1025   949     0  1483  1062   514   247   142   683   108   546
   USA   581  2697   598   729   974   763   767  1728  1414  1128     0  1217   503   446   144   889   103   812
   CZE   308   576   247   675   483   446   477   548   644   921   871     0   293   257   131   553    70   595
   IRL   353   389   255   300   412   346   369   709   344   491   485   227     0    95    55   285    32   211
   KOR   111   349   114   150   173   185   156   196   290   172   510   183    75     0    61   236    32   227
   SVN    76    97    57   154   111    86    78   106   134   123   113    97    45    42     0    98    28    93
   PRT   403   700   292   480   524   550   476   597   648   666   883   455   247   211    76     0    56   403
   EST    28    34    19    47    37    28    28    40    46    59    45    36    17    13    11    33     0    59
   HUN   216   583   209   391   362   348   334   410   538   393   716   492   181   180    67   391    30     0
   ----------------------------------------------------------------------------
HOL
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
         BEL   CHE   DEU   DFS   FRA   GBR   ITA   NLD   USA   CZE   JPN   IRL   KOR   CAN   PRT   ESP   SVN   EST   HUN   NZL
   ----------------------------------------------------------------------------
   BEL     0   452   607   302   458   625   528   824   635   366   235   317   149   452   293   503   111    64   232   197
   CHE   455     0   711   261   405   628   610   722   829   363   246   287   168   630   268   500    93    60   240   184
   DEU   535   498     0   771  1182  1207  1604  1682  1886  1044   649   345   332  1217   522  1055   220   148   581   229
   DFS   241   205   321     0   425   627   528   789   686   436   220   276   132   324   262   415    85    60   225   198
   FRA   429   334   447   173     0   781   962   930  1126   691   522   267   266   761   405   723   133    99   468   175
   GBR   651   595   648   352   491     0  1203  1393  1882   734   480   583   305  1028   485   948   159   109   471   318
   ITA   530   534   776   360   528  1013     0  1185  1905   912   653   342   389  1305   553  1039   184   131   615   210
   NLD   901   686  1011   504   574  1147  1010     0  1696  1023   477   505   275   867   494   904   179   137   474   388
   USA   570   729   731   343   542  1718  1485  1274     0  1123   868   459   524  2051   652  1361   170   134   724   318
   CZE   284   253   647   231   396   507   659   888   818     0   432   243   297   725   416   641   159    95   513   171
   JPN   150   149   181   107   180   227   258   221   304   159     0   148   276   609   278   523    92    67   333   125
   IRL   327   289   277   205   242   644   337   480   448   188   113     0    93   277   173   340    66    39   162   218
   KOR   116   126   166    77   164   218   326   184   593   210   148    72     0   401   246   308    73    49   249    95
   CAN   473   549   557   250   496  1098  1128   860  2266   531   272   301   376     0   503   907   145    96   571   193
   PRT   288   227   380   192   352   425   528   464   676   344   164   151   214   508     0   443   107    73   315   136
   ESP   502   394   471   273   507   766   725   755   839   399   201   344   200   593   382     0   135    95   449   214
   SVN    87    69   202    58    91   121   161   155   133   118    45    53    49   112    84   100     0    44   106    49
   EST    41    27    67    25    41    53    66    83    70    53    20    24    23    51    50    43    23     0    76    30
   HUN   183   182   342   148   289   362   488   337   641   424   147   136   197   531   316   305    78    46     0   112
   NZL   167   166   180   128   133   265   192   356   276   127    93   183    76   199   116   184    38    15    88     0
   ----------------------------------------------------------------------------
JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
   ----------------------------------------------------------------------------
   AUS     0   137    75    92    44   147   232   124    16    11
   CAN   142     0    65   120    48    73   386   137    13    15
   DFS    49    49     0    87    52    77   125   105    16    29
   GBR    90   123    78     0    50    75   150   103    14    29
   ITA    43    46    49    50     0    36    64    57    14    16
```

```
NZL   148    74    55    76    32     0   147   100    16    15
USA   229   385    89   157    68   154     0   241    29    28
ZAF   126   135    84   101    57    96   246     0    25    21
NLD    12     8    11    11    11    13    30    20     0     3
CHE     9    13    28    27    17    13    28    21     2     0
--------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
--------------------------------------------------------------------------
  AUS     0   137    75    92    44   147   232   117    16    19
  CAN   142     0    65   120    48    73   386   126    13    21
  DFS    49    49     0    87    52    77   125    96    16    40
  GBR    90   123    78     0    50    75   150    98    14    37
  ITA    43    46    49    50     0    36    64    57    14    24
  NZL   148    74    55    76    32     0   147    91    16    22
  USA   229   385    89   157    68   154     0   221    29    36
  ZAF   120   126    78    97    57    88   228     0    25    34
  NLD    12     8    11    11    11    13    30    20     0     7
  CHE    16    19    38    35    24    19    36    33     5     0
--------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   NZL   ZAF   NLD   USA   CHE
--------------------------------------------------------------------------
  AUS     0   137    75    92    44   147   117    16   232    23
  CAN   142     0    65   120    48    73   126    13   386    25
  DFS    49    49     0    87    52    77    96    16   125    42
  GBR    90   123    78     0    50    75    98    14   150    40
  ITA    43    46    49    50     0    36    57    14    64    27
  NZL   148    74    55    76    32     0    91    16   147    26
  ZAF   120   126    78    97    57    88     0    25   221    38
  NLD    12     8    11    11    11    13    20     0    29     9
  USA   229   385    89   157    68   154   228    30     0    40
  CHE    19    21    40    38    26    23    36     6    40     0
--------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   USA   ZAF   NLD   CHE
--------------------------------------------------------------------------
  AUS     0   137    72    91    44   232   123     4    23
  CAN   142     0    65   120    48   386   137     5    25
  DFS    47    49     0    85    52   125   104     6    42
  GBR    89   123    76     0    50   150   103     8    40
  ITA    43    46    49    50     0    64    57     5    27
  USA   229   385    89   157    68     0   240    12    40
  ZAF   125   135    83   101    57   245     0    10    38
  NLD     1     3     6     6     4    11     8     0     4
  CHE    19    21    40    38    26    40    36     4     0
--------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
        AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
--------------------------------------------------------------------------
  AUS     0   137    75    92    44   147   232   124    16    23
  CAN   142     0    65   120    48    73   386   137    13    25
  DFS    49    49     0    87    52    77   125   105    16    42
  GBR    90   123    78     0    50    75   150   103    14    40
```

ITA	43	46	49	50	0	36	64	57	14	27
NZL	148	74	55	76	32	0	147	100	16	26
USA	229	385	89	157	68	154	0	241	29	40
ZAF	126	135	84	101	57	96	246	0	25	38
NLD	12	8	11	11	11	13	30	20	0	9
CHE	19	21	40	38	26	23	40	36	6	0

```
-----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DFS  GBR  ITA  NZL  USA  ZAF  NLD  CHE
-----------------------------------------------------------------------------

AUS     0  137   75   92   44  147  232  124   16   23
CAN   142    0   65  120   48   73  386  137   13   25
DFS    49   49    0   87   52   77  125  105   16   42
GBR    90  123   78    0   50   75  150  103   14   40
ITA    43   46   49   50    0   36   64   57   14   27
NZL   148   74   55   76   32    0  147  100   16   26
USA   229  385   89  157   68  154    0  241   29   40
ZAF   126  135   84  101   57   96  246    0   25   38
NLD    12    8   11   11   11   13   30   20    0    9
CHE    19   21   40   38   26   23   40   36    6    0
-----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DFS  GBR  ITA  NZL  USA  ZAF  NLD  CHE
-----------------------------------------------------------------------------

AUS     0  137   75   92   44  147  232  124   16   23
CAN   142    0   65  120   48   73  386  137   13   25
DFS    49   49    0   87   52   77  125  105   16   42
GBR    90  123   78    0   50   75  150  103   14   40
ITA    43   46   49   50    0   36   64   57   14   27
NZL   148   74   55   76   32    0  147  100   16   26
USA   229  385   89  157   68  154    0  241   29   40
ZAF   126  135   84  101   57   96  246    0   25   38
NLD    12    8   11   11   11   13   30   20    0    9
CHE    19   21   40   38   26   23   40   36    6    0
-----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DFS  ITA  ZAF  NLD  USA  CHE
-----------------------------------------------------------------------------

AUS     0  137   72   44   95   16  232   23
CAN   142    0   65   48  112   13  386   25
DFS    47   49    0   52   75   16  125   42
ITA    43   46   49    0   51   14   64   27
ZAF    95  106   60   49    0   22  186   38
NLD    12    8   11   11   15    0   29    9
USA   229  385   89   68  182   30    0   40
CHE    19   21   40   26   36    6   40    0
-----------------------------------------------------------------------------
JER
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE
-----------------------------------------------------------------------------

AUS     0  137   72   91   44  232  123   16   23
CAN   142    0   65  120   48  386  137   13   25
DFS    47   49    0   85   52  125  104   16   42
GBR    89  123   76    0   50  150  103   14   40
```

```
 ITA    43    46    49    50     0    64    57    14    27
 USA   229   385    89   157    68     0   240    29    40
 ZAF   125   135    83   101    57   245     0    25    38
 NLD    12     8    11    11    11    30    20     0     9
 CHE    19    21    40    38    26    40    36     6     0
 ------------------------------------------------------------------------

JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
 ------------------------------------------------------------------------

  AUS     0   137    75    92    44   147   232   124    16    23
  CAN   142     0    65   120    48    73   386   137    13    25
  DFS    49    49     0    87    52    77   125   105    16    42
  GBR    90   123    78     0    50    75   150   103    14    40
  ITA    43    46    49    50     0    36    64    57    14    27
  NZL   148    74    55    76    32     0   147   100    16    26
  USA   229   385    89   157    68   154     0   241    29    40
  ZAF   126   135    84   101    57    96   246     0    25    38
  NLD    12     8    11    11    11    13    30    20     0     9
  CHE    19    21    40    38    26    23    40    36     6     0
 ------------------------------------------------------------------------

JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
 ------------------------------------------------------------------------

  AUS     0   137    72    92    44   147   232   124    16    23
  CAN   142     0    59   120    48    73   386   137    13    25
  DFS    47    47     0    78    52    70   118    98    16    42
  GBR    90   123    73     0    50    74   150   102    14    40
  ITA    43    46    49    50     0    36    64    57    14    27
  NZL   148    74    49    75    32     0   147    99    16    26
  USA   229   385    84   157    68   154     0   241    29    40
  ZAF   126   135    81   100    57    95   246     0    25    38
  NLD    12     8    11    11    11    13    30    20     0     9
  CHE    19    21    40    38    26    23    40    36     6     0
 ------------------------------------------------------------------------

JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   NZL   USA   ZAF   NLD   CHE
 ------------------------------------------------------------------------

  AUS     0   137    75    92    44   147   232   124    16    23
  CAN   142     0    65   120    48    73   386   137    13    25
  DFS    49    49     0    87    52    77   125   105    16    42
  GBR    90   123    78     0    50    75   150   103    14    40
  ITA    43    46    49    50     0    36    64    57    14    27
  NZL   148    74    55    76    32     0   147   100    16    26
  USA   229   385    89   157    68   154     0   241    29    40
  ZAF   126   135    84   101    57    96   246     0    25    38
  NLD    12     8    11    11    11    13    30    20     0     9
  CHE    19    21    40    38    26    23    40    36     6     0
 ------------------------------------------------------------------------
JER
--------
  common bulls below diagonal
  common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   USA   ZAF   NLD   CHE
 ------------------------------------------------------------------------

  AUS     0   137    73    91    44   232   124    16    23
  CAN   142     0    65   119    48   383   137    13    25
  DFS    48    49     0    85    52   125   105    16    42
```

```
   GBR     89    122     76      0     50    150    103     14     40
   ITA     43     46     49     50      0     64     57     14     27
   USA    229    383     89    157     68      0    240     29     40
   ZAF    126    135     84    101     57    245      0     25     38
   NLD     12      8     11     11     11     30     20      0      9
   CHE     19     21     40     38     26     40     36      6      0
        ----------------------------------------------------------------------
JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
          AUS  CAN  DFS  GBR  ITA  NZL  USA  ZAF  NLD  CHE
        ----------------------------------------------------------------------
   AUS     0   137   75   92   44  147  232  124   16   23
   CAN   142     0   65  120   48   73  386  137   13   25
   DFS    49    49    0   87   52   77  125  105   16   42
   GBR    90   123   78    0   50   75  150  103   14   40
   ITA    43    46   49   50    0   36   64   57   14   27
   NZL   148    74   55   76   32    0  147  100   16   26
   USA   229   385   89  157   68  154    0  241   29   40
   ZAF   126   135   84  101   57   96  246    0   25   38
   NLD    12     8   11   11   11   13   30   20    0    9
   CHE    19    21   40   38   26   23   40   36    6    0
        ----------------------------------------------------------------------
JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
          AUS  CAN  DFS  GBR  ITA  USA  ZAF  NLD  CHE
        ----------------------------------------------------------------------
   AUS     0   137   72   91   44  232  116   16   23
   CAN   142     0   65  120   48  386  126   13   25
   DFS    47    49    0   85   52  125   95   16   42
   GBR    89   123   76    0   50  150   98   14   40
   ITA    43    46   49   50    0   64   57   14   27
   USA   229   385   89  157   68    0  220   29   40
   ZAF   119   126   77   97   57  227    0   25   38
   NLD    12     8   11   11   11   30   20    0    9
   CHE    19    21   40   38   26   40   36    6    0
        ----------------------------------------------------------------------
JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
          AUS  CAN  DFS  NZL  ZAF  NLD  USA  CHE
        ----------------------------------------------------------------------
   AUS     0   137   65  147  114   16  232   23
   CAN   142     0   55   73  123   13  386   25
   DFS    42    44    0   63   87   16  111   42
   NZL   148    74   45    0   86   16  147   26
   ZAF   115   120   70   79    0   25  216   38
   NLD    12     8   11   13   20    0   29    9
   USA   229   385   79  154  215   30    0   40
   CHE    19    21   40   23   36    6   40    0
        ----------------------------------------------------------------------
JER
--------
   common bulls below diagonal
   common three quarter sib group above diagonal
          AUS  CAN  DFS  GBR  ITA  NZL  USA  NLD  CHE
        ----------------------------------------------------------------------
   AUS     0   137   75   35   44  147  232   16   19
   CAN   142     0   65   38   48   73  386   13   21
   DFS    49    49    0   30   52   77  125   16   40
   GBR    40    43   28    0   14   37   37    4    3
   ITA    43    46   49   15    0   36   64   14   24
```

```
   NZL   148    74    55    41    32     0   147    16    22
   USA   229   385    89    40    68   154     0    29    36
   NLD    12     8    11     5    11    13    30     0     7
   CHE    16    19    38     4    24    19    36     5     0
   ------------------------------------------------------------------------------
JER
 --------
   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   NZL   USA   NLD   CHE
   ------------------------------------------------------------------------------
   AUS     0   137    72    92   147   232    16    19
   CAN   142     0    59   119    73   383    13    21
   DFS    47    47     0    78    70   118    16    40
   GBR    90   122    73     0    72   150    14    37
   NZL   148    74    49    73     0   147    16    22
   USA   229   383    84   157   154     0    29    36
   NLD    12     8    11    11    13    30     0     7
   CHE    16    19    38    35    19    36     5     0
   ------------------------------------------------------------------------------
JER
 --------
   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS   CAN   DFS   GBR   ITA   USA   NLD   CHE
   ------------------------------------------------------------------------------
   AUS     0   125    65    83    40   211    15    18
   CAN   129     0    65   119    48   386    13    21
   DFS    41    49     0    85    52   125    16    40
   GBR    81   122    76     0    50   150    14    37
   ITA    38    46    49    50     0    64    14    24
   USA   201   385    89   157    68     0    29    36
   NLD    11     8    11    11    11    30     0     7
   CHE    16    19    38    35    24    36     5     0
   ------------------------------------------------------------------------------
JER
 --------
JER
 --------
RDC
 --------
   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
   ------------------------------------------------------------------------------
   AUS     0    23     9    39     9    12    20    13     7     2
   CAN    23     0     7   126    61     4    33   137     3     0
   DEU     9     7     0    30     1     8     4     1     8     0
   DFS    28   126    20     0    43    72    56    70    30     0
   GBR     8    59     1    40     0     0    24    48     1     0
   NOR     8     4     7    50     0     0     7     0    19     0
   NZL    19    31     4    53    21     6     0    21     2     3
   USA    13   131     1    66    43     0    20     0     2     0
   NLD     7     3     8    29     1    19     2     2     0     0
   CAM     2     0     0     0     0     0     3     0     0     0
   ------------------------------------------------------------------------------
RDC
 --------
   common bulls below diagonal
   common three quarter sib group above diagonal
         AUS   CAN   DEU   DFS   GBR   NZL   USA   NLD   CAM   NOR
   ------------------------------------------------------------------------------
   AUS     0    23     9    39     9    20    13     7     2     4
   CAN    23     0     7   126    61    33   137     3     0     1
   DEU     9     7     0    30     1     4     1     8     0     3
   DFS    28   126    20     0    43    54    70    28     0    30
```

```
GBR     8    59     1    40     0    24    48     1     0     0
NZL    19    31     4    51    21     0    21     2     3     2
USA    13   131     1    66    43    20     0     2     0     0
NLD     7     3     8    27     1     2     2     0     0     8
CAM     2     0     0     0     0     3     0     0     0     0
NOR     3     1     2    16     0     2     0     8     0     0
-------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
-------------------------------------------------------------------------

AUS     0    23     9    39     9     4    20    13     7     2
CAN    23     0     7   126    61     1    33   135     3     0
DEU     9     7     0    30     1     3     4     1     8     0
DFS    28   126    20     0    43    46    54    70    28     0
GBR     8    59     1    40     0     0    24    47     1     0
NOR     3     1     2    28     0     0     3     0    14     0
NZL    19    31     4    51    21     3     0    21     2     3
USA    13   130     1    66    42     0    20     0     2     0
NLD     7     3     8    27     1    14     2     2     0     0
CAM     2     0     0     0     0     0     3     0     0     0
-------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   USA   NLD   CAM
-------------------------------------------------------------------------

AUS     0    23     9    39     9    13     7     2
CAN    23     0     7   126    61   137     3     0
DEU     9     7     0    30     1     1     8     0
DFS    28   126    20     0    43    70    26     0
GBR     8    59     1    40     0    48     1     0
USA    13   131     1    66    43     0     2     0
NLD     7     3     8    26     1     2     0     0
CAM     2     0     0     0     0     0     0     0
-------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
-------------------------------------------------------------------------

AUS     0    23     9    39     9    12    20    13     7     2
CAN    23     0     7   126    61     4    33   137     3     0
DEU     9     7     0    30     1     9     4     1     8     0
DFS    28   126    20     0    43    81    53    70    29     0
GBR     8    59     1    40     0     0    24    48     1     0
NOR     8     4     8    57     0     0     7     0    19     0
NZL    19    31     4    48    21     6     0    21     2     3
USA    13   131     1    66    43     0    20     0     2     0
NLD     7     3     8    28     1    19     2     2     0     0
CAM     2     0     0     0     0     0     3     0     0     0
-------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NZL   USA   NLD   CAM   NOR
-------------------------------------------------------------------------

AUS     0    23     9    39     9    20    13     7     2     4
CAN    23     0     7   126    61    33   137     3     0     1
DEU     9     7     0    30     1     4     1     8     0     3
DFS    28   126    20     0    43    54    70    29     0    30
```

```
GBR     8    59     1    40     0    24    48     1     0     0
NZL    19    31     4    51    21     0    21     2     3     2
USA    13   131     1    66    43    20     0     2     0     0
NLD     7     3     8    28     1     2     2     0     0     8
CAM     2     0     0     0     0     3     0     0     0     0
NOR     3     1     2    16     0     2     0     8     0     0
-----------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
-----------------------------------------------------------------------
AUS     0    23     9    39     9    12    20    13     7     2
CAN    23     0     7   126    61     4    33   137     3     0
DEU     9     7     0    30     1     9     4     1     8     0
DFS    28   126    20     0    43    84    56    70    30     0
GBR     8    59     1    40     0     0    24    48     1     0
NOR     8     4     8    59     0     0     7     0    19     0
NZL    19    31     4    53    21     6     0    21     2     3
USA    13   131     1    66    43     0    20     0     2     0
NLD     7     3     8    29     1    19     2     2     0     0
CAM     2     0     0     0     0     0     3     0     0     0
-----------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS   CAN   DEU   DFS   NOR   NLD   USA   CAM
-----------------------------------------------------------------------
AUS     0    20     9    38    12     7    11     2
CAN    20     0     7   125     4     3   137     0
DEU     9     7     0    30     9     8     1     0
DFS    27   125    20     0    81    27    70     0
NOR     8     4     8    57     0    19     0     0
NLD     7     3     8    26    19     0     2     0
USA    11   131     1    66     0     2     0     0
CAM     2     0     0     0     0     0     0     0
-----------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS   CAN   DEU   DFS   GBR   NOR   USA   NLD   CAM
-----------------------------------------------------------------------
AUS     0    23     6    39     9    12    13     7     2
CAN    23     0     5   126    61     4   137     3     0
DEU     6     5     0    22     1     7     1     8     0
DFS    28   126    15     0    43    81    70    28     0
GBR     8    59     1    40     0     0    48     1     0
NOR     8     4     6    57     0     0     0    19     0
USA    13   131     1    66    43     0     0     2     0
NLD     7     3     8    27     1    19     2     0     0
CAM     2     0     0     0     0     0     0     0     0
-----------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
-----------------------------------------------------------------------
AUS     0    23     9    39     9    12    20    13     7     2
CAN    23     0     7   126    61     4    33   137     3     0
DEU     9     7     0    30     1     9     4     1     8     0
DFS    28   126    20     0    43    84    56    70    28     0
GBR     8    59     1    40     0     0    24    48     1     0
```

```
 NOR     8     4     8    59     0     0     7     0    19     0
 NZL    19    31     4    53    21     6     0    21     2     3
 USA    13   131     1    66    43     0    20     0     2     0
 NLD     7     3     8    27     1    19     2     2     0     0
 CAM     2     0     0     0     0     0     3     0     0     0
 ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
 ---------------------------------------------------------------------------
 AUS     0    23     9    39     9    12    20    13     7     2
 CAN    23     0     7   126    61     4    33   137     3     0
 DEU     9     7     0    30     1     9     4     1     8     0
 DFS    28   126    20     0    43    81    54    70    28     0
 GBR     8    59     1    40     0     0    24    48     1     0
 NOR     8     4     8    57     0     0     7     0    19     0
 NZL    19    31     4    50    21     6     0    21     2     3
 USA    13   131     1    66    43     0    20     0     2     0
 NLD     7     3     8    27     1    19     2     2     0     0
 CAM     2     0     0     0     0     0     3     0     0     0
 ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
 ---------------------------------------------------------------------------
 AUS     0    23     9    39     9    12    20    13     7     2
 CAN    23     0     7   126    61     4    33   137     3     0
 DEU     9     7     0    30     1     9     4     1     8     0
 DFS    28   126    20     0    43    74    56    70    30     0
 GBR     8    59     1    40     0     0    24    48     1     0
 NOR     8     4     8    52     0     0     7     0    19     0
 NZL    19    31     4    53    21     6     0    21     2     3
 USA    13   131     1    66    43     0    20     0     2     0
 NLD     7     3     8    29     1    19     2     2     0     0
 CAM     2     0     0     0     0     0     3     0     0     0
 ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   USA   NLD   CAM
 ---------------------------------------------------------------------------
 AUS     0    23     9    39     9    12    13     7     2
 CAN    23     0     7   126    61     4   134     3     0
 DEU     9     7     0    30     1     9     1     8     0
 DFS    28   126    20     0    43    84    70    30     0
 GBR     8    59     1    40     0     0    48     1     0
 NOR     8     4     8    59     0     0     0    19     0
 USA    13   130     1    66    43     0     0     2     0
 NLD     7     3     8    29     1    19     2     0     0
 CAM     2     0     0     0     0     0     0     0     0
 ---------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   NZL   USA   NLD   CAM
 ---------------------------------------------------------------------------
 AUS     0    23     9    39     9    12    20    13     7     2
 CAN    23     0     7   126    61     4    33   137     3     0
 DEU     9     7     0    30     1     9     4     1     8     0
 DFS    28   126    20     0    43    81    54    70    29     0
```

```
 GBR    8   59    1   40    0    0   24   48    1    0
 NOR    8    4    8   57    0    0    7    0   19    0
 NZL   19   31    4   51   21    6    0   21    2    3
 USA   13  131    1   66   43    0   20    0    2    0
 NLD    7    3    8   28    1   19    2    2    0    0
 CAM    2    0    0    0    0    0    3    0    0    0
 ------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  USA  NLD  CAM
 ------------------------------------------------------------------------
 AUS    0   23    9   39    9   12   13    7    2
 CAN   23    0    7  126   61    4  135    3    0
 DEU    9    7    0   30    1    9    1    8    0
 DFS   28  126   20    0   43   78   70   30    0
 GBR    8   59    1   40    0    0   47    1    0
 NOR    8    4    8   54    0    0    0   19    0
 USA   13  130    1   66   42    0    0    2    0
 NLD    7    3    8   29    1   19    2    0    0
 CAM    2    0    0    0    0    0    0    0    0
 ------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  NOR  NZL  NLD  USA  CAM
 ------------------------------------------------------------------------
 AUS    0   16    9   32   12   16    7    9    2
 CAN   16    0    7  120    4   33    3  137    0
 DEU    9    7    0   27    9    4    8    1    0
 DFS   23  119   20    0   73   49   27   65    0
 NOR    8    4    8   52    0    7   19    0    0
 NZL   16   31    4   47    6    0    1   21    3
 NLD    7    3    8   26   19    1    0    2    0
 USA    9  131    1   62    0   20    2    0    0
 CAM    2    0    0    0    0    3    0    0    0
 ------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM
 ------------------------------------------------------------------------
 AUS    0   23    9   39    8   12   20   13    7    2
 CAN   23    0    7  126   58    4   33  137    3    0
 DEU    9    7    0   30    1    9    4    1    8    0
 DFS   28  126   20    0   43   93   56   70   30    0
 GBR    7   56    1   40    0    0   21   46    1    0
 NOR    8    4    8   68    0    0    7    0   19    0
 NZL   19   31    4   53   18    6    0   21    2    3
 USA   13  131    1   66   41    0   20    0    2    0
 NLD    7    3    8   29    1   19    2    2    0    0
 CAM    2    0    0    0    0    0    3    0    0    0
 ------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
       AUS  CAN  DEU  DFS  GBR  NOR  NZL  USA  NLD  CAM
 ------------------------------------------------------------------------
 AUS    0   23    9   39    8   12   20   13    7    2
 CAN   23    0    7  126   58    4   33  134    3    0
 DEU    9    7    0   30    1    9    4    1    8    0
 DFS   28  126   20    0   43   84   56   70   30    0
```

```
   GBR     7    56     1    40     0     0    21    46     1     0
   NOR     8     4     8    59     0     0     7     0    19     0
   NZL    19    31     4    53    18     6     0    21     2     3
   USA    13   130     1    66    41     0    20     0     2     0
   NLD     7     3     8    29     1    19     2     2     0     0
   CAM     2     0     0     0     0     0     3     0     0     0
 ------------------------------------------------------------------------------
RDC
--------
 common bulls below diagonal
 common three quarter sib group above diagonal
        AUS   CAN   DEU   DFS   GBR   NOR   USA   NLD   CAM
 ------------------------------------------------------------------------------
   AUS     0    25    11    47     9    14    13     9     3
   CAN    25     0     7   126    58     4   137     3     0
   DEU    11     7     0    31     1     9     1     8     0
   DFS    36   126    21     0    43    84    70    30     0
   GBR     8    56     1    40     0     0    46     1     0
   NOR    10     4     8    59     0     0     0    19     0
   USA    13   131     1    66    41     0     0     2     0
   NLD     9     3     8    29     1    19     2     0     0
   CAM     3     0     0     0     0     0     0     0     0
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