= DTM =

115 moves .

KNNNNKQ ? The knights win in 62 @.@ 5 percent of positions , with maximum DTM = 85 moves .

KQRKQR ? Despite the equality of material , the player to move wins in 67 @.@ 74 % of positions . The maximum DTC is 92 , and the maximum DTM is 117 . In both this endgame and KQQKQQ , the first player to check usually wins .

KRNKNN and KRBKNN ? Friedrich Amelung had analyzed these two endgames in the 1900s . KRNKNN and KRBKNN are won for the strongest side in 78 % and 95 % of the cases , respectively . Stiller 's DTC tablebase revealed several lengthy wins in these endgames . The longest win in KRBKNN has a DTC of 223 and a DTM of 238 moves (not shown) . Even more amazing is the position at right , where White wins starting with 1 . Ke6 ! Stiller reported the DTC as 243 moves , and the DTM was later found to be 262 moves .

For some years , this position held the record for the longest computer @-@ generated forced mate . (Otto Blathy had composed a " mate in 292 moves " problem in 1889 , albeit from an illegal starting position .) However , in May 2006 , Bourzutschky and Konoval discovered a KQNKRBN position with an astonishing DTC of 517 moves . This was more than twice as long as Stiller 's maximum , and almost 200 moves beyond the previous record of a 330 DTC for a position of KQBNKQB _ 1001 . Bourzutschky wrote , " This was a big surprise for us and is a great tribute to the complexity of chess . " Later , a similar position was shown to have a DTM of 545 .

In August 2006 , Bourzutschky released preliminary results from his analysis of the following seven @-@ piece endgames : KQQPKQQ , KRRPKRR , and KBBPKNN .

Many positions are winnable although at first sight they appear to be non @-@ winnable . For example , this position is a win for Black in 154 moves (during which the white pawn is liquidated after around eighty moves) .

In this position the White pawn 's first move is at move 119 against optimal defense by Black .

= = = Endgame studies = = =

Since many composed endgame studies deal with positions that exist in tablebases , their soundness can be checked using the tablebases . Some studies have been cooked , i.e. proved unsound , by the tablebases . That can be either because the composer 's solution does not work , or else because there is an equally effective alternative that the composer did not consider . Another way tablebases cook studies is a change in the evaluation of an endgame . For instance , the endgame with a queen and bishop versus two rooks was thought to be a draw , but tablebases proved it to be a win for the queen and bishop , so almost all studies based on this endgame are unsound .

For example , Erik Pogosyants composed the study at right , with White to play and win . His intended main line was 1 . Ne3 Rxh2 2 . O @-@ O @-@ O # ! A tablebase discovered that 1 @.@ h4 also wins for White in 33 moves , even though Black can capture the pawn (which is not the best move ? in case of capturing the pawn black loses in 21 moves , while Kh1 @-@ g2 loses in 32 moves) . Incidentally , the tablebase does not recognize the composer 's solution because it includes castling .

While tablebases have cooked some studies , they have assisted in the creation of other studies . Composers can search tablebases for interesting positions , such as zugzwang , using a method called data mining . For all three- to five @-@ piece endgames and pawnless six @-@ piece endgames , a complete list of mutual zugzwangs has been tabulated and published .

There has been some controversy whether to allow endgame studies composed with tablebase assistance into composing tourneys . In 2003 , the endgame composer and expert John Roycroft summarized the debate :

[N] ot only do opinions diverge widely , but they are frequently adhered to strongly , even vehemently : at one extreme is the view that since we can never be certain that a computer has been used it is pointless to attempt a distinction , so we should simply evaluate a ' study ' on its content , without reference to its origins ; at the other extreme is the view that using a ' mouse ' to lift

an interesting position from a ready @-@ made computer @-@ generated list is in no sense composing , so we should outlaw every such position .

Roycroft himself agrees with the latter approach . He continues , " One thing alone is clear to us : the distinction between classical composing and computer composing should be preserved for as long as possible : if there is a name associated with a study diagram that name is a claim of authorship . "

Mark Dvoretsky , an International Master , chess trainer , and author , took a more permissive stance . He was commenting in 2006 on a study by Harold van der Heijden , published in 2001 , which reached the position at right after three introductory moves . The drawing move for White is 4 . Kb4 ! ! (and not 4 . Kb5) , based on a mutual zugzwang that may occur three moves later .

Dvoretsky comments :

Here , we should touch on one delicate question . I am sure that this unique endgame position was discovered with the help of Thompson ? s famous computer database . Is this a ' flaw , ' diminishing the composer 's achievement ?

Yes , the computer database is an instrument , available to anyone nowadays . Out of it , no doubt , we could probably extract yet more unique positions ? there are some chess composers who do so regularly . The standard for evaluation here should be the result achieved . Thus : miracles , based upon complex computer analysis rather than on their content of sharp ideas , are probably of interest only to certain aesthetes .

= = " Play chess with God " = =

On the Bell Labs website , Ken Thompson maintains a link to some of his tablebase data . The headline reads , " Play chess with God . "

Regarding Stiller 's long wins , Tim Krabbé struck a similar note :

A grandmaster wouldn 't be better at these endgames than someone who had learned chess yesterday . It 's a sort of chess that has nothing to do with chess , a chess that we could never have imagined without computers . The Stiller moves are awesome , almost scary , because you know they are the truth , God 's Algorithm ? it 's like being revealed the Meaning of Life , but you don 't understand one word .

= = Nomenclature = =

Originally , an endgame tablebase was called an " endgame data base " or " endgame database " . This name appeared in both EG and the ICCA Journal starting in the 1970s , and is sometimes used today . According to Haworth , the ICCA Journal first used the word " tablebase " in connection with chess endgames in 1995 . According to that source , a tablebase contains a complete set of information , but a database might lack some information .

Haworth prefers the term " Endgame Table " , and has used it in the articles he has authored . Roycroft has used the term " oracle database " throughout his magazine , EG . Nonetheless , the mainstream chess community has adopted " endgame tablebase " as the most common name .

= = Books = =

John Nunn has written three books based on detailed analysis of endgame tablebases :

Nunn , John (1995) . " Secrets of Minor @-@ Piece Endings " . Batsford . ISBN 0 @-@ 8050 @-@ 4228 @-@ 8 .

Nunn , John (1999) . " Secrets of Rook Endings " (2nd ed .) . Gambit Publications . ISBN 1 @-@ 901983 @-@ 18 @-@ 8 .

Nunn , John (2002) . " Secrets of Pawnless Endings " (2nd ed .) . Gambit Publications . ISBN 978 @-@ 1 @-@ 901983 @-@ 65 @-@ 4 .

= = Tables = =