

# *Chess Endgame News*

Article

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Haworth (2014b) supports the text of this note with two ancillary datasets, namely a pgn file of chess lines and sidelines, and the annotation of those lines as to the uniqueness of the best moves. Lines are played to the SZ<sub>50'</sub> strategy minimaxing DTZ<sub>50'</sub> and SZ-sidelines are also included to show where they first diverge. Table 1's positions are clearly indicated. Following the Chess Study's convention, White has the attacking role.

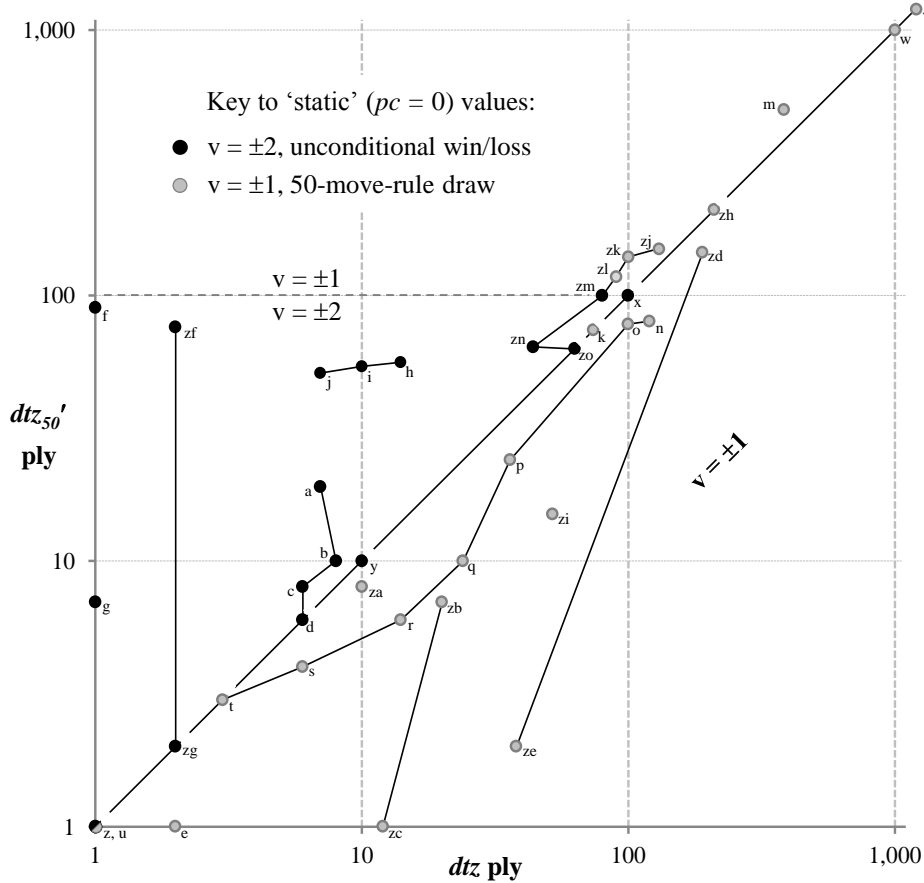


Figure 1. Schematic, not to scale, of cited positions connected as to their DTZ<sub>50'</sub>-minimaxing lines.

Result	Value, v		dtz <sub>50'</sub> > dtz	dtz <sub>50'</sub> = dtz	dtz <sub>50'</sub> < dtz
Decisive, even with 50mr	±2	Comment ... winner ends phase loser ends phase	given the 50mr, the phase needs more moves A(a-c), F(f), G(g), H(h-j) ZF(zf), ZJ(zm-zn)	most common situation: the 50mr has no effect A(d), V(x-z) ZF(zg), ZJ(zo)	defender, with no value to defend, maximises DTZ  there are no positions
50mr draw	±1	Comment ... attacker ends phase defender ends phase	precedes the harder win; dtz <sub>50'</sub> > 100p ? M(m), ZJ(zj-zl)	unavoidable, overlong (current or later) phase K(k), N(t-u), V(v-w) ZH(zh)	The defender's priority is the '-1' value, not DTZ N(n-s), ZA(za), ZD(zd-ze) E(e), ZB(zb-zc), ZI(zi)

Table 2. Taxonomy of endgame positions by value and sgn(dtz<sub>50'</sub> - dtz).

A brief commentary now follows for each of the six sections of the above taxonomy.

**a) v = ±2, dtz<sub>50'</sub> > dtz:** the attacker has a win despite the 50mr so dtz<sub>50'</sub> ≤ 100 ply. However, they have to avoid a subsequent phase of more than 100p and need to use more than dtz moves to do so. For the KQPKQ position f, dtz<sub>50'</sub> - dtz = 98p but this record would be broken by a phase continued for 100p rather than immediately ended. The defender only ends the phase if this is unavoidable as in KNNKP line ZF where the forced P-push is characteristic of this endgame.

**b) v = ±1, dtz<sub>50'</sub> > dtz:** the attacker incurs a 50mr-draw in this phase where they invest to avoid one in a later phase. In creating the DTZ<sub>50'</sub> EGT, positions in the above section with v = ±2 and dtz < dtz<sub>50'</sub> = 100p, already doubly rare, may perhaps be backed up again to 'prior' positions with dtz<sub>50'</sub> > 100p and therefore v = ±1. As

KNNKP line ZJ proceeds, the  $dtz$  and  $dtz_{50}'$  depths, both initially greater than 100 ply, fall in turn to and below 100 ply before  $dtz_{50}' = dtz$ . Bourzutschky and Konoval (2012) mention a maxDTZ 6m P-ful position as having  $dtz = 192$  moves,  $384 \pm 1p$ . Position  $m$  has  $dtz_{50}' = 387p$  (de Man, 2013b) and therefore has  $dtz_{50}' > dtz$ .

**c)  $v = \pm 2$ ,  $dtz_{50}' = dtz$ :**  $dtz_{50}' \leq 100p$ . This is the most common type of position: the 50mr is no longer relevant in the phase. All lines in section 'a', such as A, F, G, H and ZF eventually lead to positions here. Again, as in scenario 'a', the defender has nothing to gain by terminating the phase voluntarily.

**d)  $v = \pm 1$ ,  $dtz_{50}' = dtz$ :** there are two cases here. First,  $dtz_{50}' > 100p$  immediately implies that  $v = \pm 1$  as in scenario 'b'. Where  $dtz_{50}' \leq 100p$ ,  $v = \pm 1$  because the attacker cannot avoid a subsequent overlong phase. Therefore they have no subsequent need to diverge from a DTZ-minimizing strategy, even had the ply-count been zero. Their aim should in fact be to minimise the maximum length of all possible phases of play with a more subtle strategy as allowed by the ply budget. However, the 'Depth by the Rule' information (Haworth, 2000, 2001) which helps here is not available from EGTs focussed only on DTZ-related metrics which say nothing about future phases. Positions  $v$ ,  $w$  and  $zh$  have  $dtz_{50}' > 100p$  while positions  $k$  ( $dtz = 76p$ ),  $t$  and  $u$  force the attacker into a subsequent phase of more than 100 ply.

**e)  $v = \pm 2$ ,  $dtz_{50}' < dtz$ :** there are in fact no positions of this type. Given that  $v = \pm 2$ , the defender cannot aspire to a 50mr draw and therefore has no reason to do other than maximise DTZ. Thus,  $v = \pm 2$  implies  $dtz_{50}' \geq dtz$ .

**f)  $v = \pm 1$ ,  $dtz_{50}' < dtz$ :** here, the defender's priority is to defend the 50mr draw value of '1'. Therefore, the length of the phase,  $dtz$ , is a secondary consideration, ignored at least once. The first phase of DTZ<sub>50'</sub>-minimaxing play may therefore be ended optionally by the defender as in lines E, ZB and ZI. In positions  $n$  and  $zd$ , the defender has a 50mr-draw in the current phase because  $dtz > 100p$ . However, the DTZ<sub>50'</sub> EGT does not incorporate this fact. Instead, it ultimately leads to a 50mr-draw in a later phase, the next in line N and the fourth in line ZD. The KBBNKN line ZI starts with the greatest known value of  $dtz - dtz_{50}' = 37p$ , another record to be broken.

When annotating the uniqueness of moves in the historical context of an SZ<sub>50'</sub> line of play (Haworth, 2013), it is necessary to consider the ply-count as well as the DTZ<sub>50'</sub> EGT data which stores 'static' position-values, assuming ply count  $pc = 0$ . In the extreme, 100 ply might have been played already when the EGT indicates that there is only one move which retains a 50mr draw. However, in the context of past play, any move (other than one allowing immediate termination of the phase) will retain the possibility of a later draw-claim.

Those interested in the evolution of EGTs owe a debt of gratitude to Ronald de Man for his fascinating and extremely practical DTZ<sub>50'</sub> tables. My thanks also to Oswaldo Cadenas, Harold van der Heijden, John Nunn and Emil Vlasák who helped me identify and overcome the software problems mentioned. Thanks as ever to Eiko Bleicher (2014) and John Tamplin (2014) for their long running depth-evaluation services.

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