Chess Endgame News

CHESS ENDGAME NEWS

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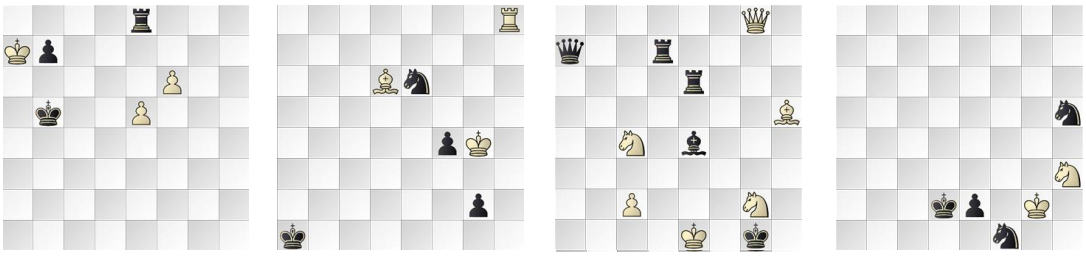
This note investigates the recently revived proposal that the stalemated side should lose, and comments further on the information provided by the FRITZ14 interface to Ronald de Man's DTZ_{50}' endgame tables (EGTs). Tables 1 and 2 list relevant positions: data files (Haworth, 2014b) provide chess-line sources and annotation.

Pos.	w-b	Endgame	FEN	Notes
g1	3-2	KBPKP	8/5KBk/8/8/p7/P7/8/8 b - - 34 124	Korchnoi - Karpov, WCC.5 (1978)
g2	3-3	KPPKPP	8/6p1/5p2/5P1K/4k2P/8/8/8 b - - 2 65	Anand - Kramnik, WCC.5 (2007) 65. … Kxf5′′ ==
g3	3-2	KRKRB	5r2/8/8/8/8/3kb3/3R4/3K4 b - - 94 109	Carlsen - van Wely, Corus (2007) 109. … Bxd2 ==
g4	7-7	KQR..KQR..	2Q5/5Rpk/8/1p2p2p/1P2Pn1P/5Pq1/4r3/7K w	Evans - Reshevsky, USC (1963), 49. Qg8+ Kxg8 50. Rxg7+
jb1	3-3	KPPKRP	4r3/Kp6/5P2/1k2P3/8/8/8/8 w - - 0 1	Kubbel (1916) 1. f7 Rf8 2. e6 b6 3. Kb7 Kc5 4. e7 Rxf7 …
jb2	3-4	KRBKNPP	7R/8/3Bn3/8/5pK1/8/6p1/k7 w - - 0 1	Sehwers (1905) 1. Be5+ Kb1 2. Rb8+ Kc1 3. Bxf4+ Nxf4 …
jb3	6-5	KQ..KQRR..	6Q1/q2r4/4r3/7B/2N1b3/8/2P3N1/4K1k1 w	Lewandowski (1986) 1. Ne3+ Bg6 2. Qxe6 Qa1+ 3. Bd1 …
jb4	2-4	KNKNNP	8/8/8/7n/8/7N/3kp1K1/5n2 w - - 0 1	Herbstman & Kubbel (1937) 1.Ng1 Ne3+ 2. Kh3 Nf4+ …
m1	4-4	KPPPKPPP	7k/6pP/6P1/8/8/1p6/pP6/K7 w - - 1 2	Mutual stalemate following, e.g., 1. ... Kh8/a2/b3
m2	3-4	KPPKPPP	8/8/8/8/1p6/kPp5/p1P5/K7 w - - 0 2	Mutual stalemate following, e.g., 1. … Ka3/b4/c3
m3	2-4	KPKPPP	8/8/8/8/8/3p4/p1pP4/k1K5 w - - 0 2	Mutual stalemate following, e.g., 1. … a2/c2/d3
s3	2-3	KPKPP	8/8/8/8/8/3p4/p2P4/k1K5 b - - 0 1	Derived from *m3* . If 1. … null 2. Kd1° Kb2 3. Ke1° Kc1, 0-1
m4	2-4	KKBPPP	8/8/8/8/8/2p5/p1p5/kbK5 b - - 1 1	Mutual stalemate following, e.g., 1. Kc1
s4	2-3	KKBPP	8/8/8/8/8/8/p1p5/kbK5 b - - 1 1	Derived from *m4* . If 1. … null 2. Kd2° Kb2, 0-1
m5	2-4	KKPPPP	8/8/8/8/pp6/kp6/1p6/1K6 b - - 1 1	Mutual stalemate following, e.g., 1. Kb1
s5	2-3	KKPPP	8/8/8/pp6/kp6/1p6/1K6/8 b - - 1 1	Derived from *m5* . If 1. … null 2. K~ Ka3 3. K~ b2, 0-1
s6	2-2	KPKP	7k/6pP/6K1/8/8/8/8/8 b - - 0 1	If 1. … null 2. K(f/g/h)5 Kxh7 … 19. … g1=Q … 0-1

Table 1. Cited positions related to the stalemate theme.

The proposal that winning should be about closeting rather than capturing the King is not new but it is fundamental. The stalemate theme has a convoluted history (Murray, 1913): Wikipedia (2014) provides a comprehensive and authoritative introduction with many references. What are the arguments for and against, and do these suggest an alternative proposal or even that the status quo is not broken and does not need fixing?

Supporters of change say stalemate is the 'ultimate zugzwang', that the side stalemated is unable to carry out its obligation to move and so should not share the points equally with the other side. But it does not follow that one side has 'won' and the other 'lost': the 'half win' has its place in stalemate's history. Point schemes such as 0, 1 (stalemated), 2 (draw), 3 (stalemating) and 4 (conventional win), or 0, 1, 2, 4 (stalemating) and 6 (win) could be brought in, stalemate perhaps serving a role in the tie-breaker rules for events.



Kubbel (1916) Sehwers (1905) Lewandowski (1986) Herbstmann & Kubbel (1937)

Figure 1. Four 'White to draw' stalemate studies from Beasley and Whitworth (1996).

The opposition argues that the stalemate resource encourages more speculative, less materialistic play and increases the game's residual intellectual challenge:[2] the games of positions *g1-g4* illustrate this. They argue that containing the King in his keep is not the same as removing the King from the field of play, and that this break in

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[2] Including the very occasional 'gem' underpromotion to N, R or even B. See also Afek's win study HHDBIV #66984.

the history of the game, creating a new game, even necessitates knowing which chess games and studies were created under the earlier rule and which under the later rule. The 'intellectual interest' argument might appeal to endgame aficionados. This journal has long drawn on the complexities of the KNNKP endgame with its deep phases of play, deep mates, subtleties induced by the 50-move rule and even deeper mates in consequence. Upstream, KNNKNP is made the more difficult (Haworth, 2014a) if KNNKP follows as is likely. Downstream, the related KNNK features in endgame lore as the FEG EGT generator initially assumed there were no KNNK wins – an error whose effect rippled through many prior endgames' FEG EGTs (Hurd and Haworth, 2010). In the same way, declaring stalemate a win will fundamentally change the endgame, creating new, longer wins, shortening existing wins, and affecting all force profiles, beginning with the most humble, KBK and KNK.

The 'stalemate theme' evident in many chess endgame studies would be lost for the future. Some 11,207 (14.7%) of catalogued studies (Van der Heijden, 2010) end in stalemate and 19,449 (25.5%) have stalemate in a subline. Akobia (2013) lists over 4,200 of them. Beasley and Whitworth (1996) highlight twelve choice examples with solutions 5-7 moves long, see also Table 1 (*jb1-jb4*) and Figure 1.

But what of even rarer mutual stalemate positions such as *m1-m5* communicated by Noam Elkies? Should these be deemed drawn or should the stalemating side get the 'stalemate points' as above. If the *emergency null move*, proposed in the past, is restored as an option, mutual stalemate is a draw by threefold repetition. However, matters are now more complicated. In related positions *s3-s5*, Black is stalemated, plays a null move and goes on to win. Should Black get maximum points for these wins, or should its score be reduced in consideration of the 'null move assistance'? From *sm5*, Black requires this assistance twice, so should its score be reduced twice in a more accommodating [0, *n*, 2*n*] or [0, *n*, 3*n*] scoring system with $n \geq 3$?

It may be that those proposing change have not understood the full impact of that change. The computation of EGTs under modified rules would certainly provide a richer context for a decision. Regarding stalemating as winning or losing would not create a major task as this merely requires a change to the initialisation of the EGT process. The subsequent generation of the EGT could even be expedited by knowledge of chess as it is now: wins remain wins. However, discovering and characterising the impact of this change to the rules would be a bigger challenge. How are existing wins shortened? How many draws become wins, and what is the depth profile of these extra wins? If stalemate is regarded as a half-win, the depths of existing wins are unaffected but this requires a greater change to the EGT generation process. Notionally, there would be 5 position-values, but current wins and losses would have unchanged depths, so the computation could be focused on current draws.

					Value		DTZ$_{50}$′				
Line	**Pos.**	**w-b**	**Endgame**	**FEN**	**'5v'**	**1-0?**	**ply**	**moves**	**shown**	**error**	**Notes**
—	p1	4-2	KRRPKQ	8/8/5q2/8/2k5/3R4/1KP5/2R5 w - - 0 1	1	'1-0'	106	53	53	0	1. Ka2 was deemed optimal, pre the bug fix
—	p2	5-1	KQQRBK	8/8/8/Q1R5/8/2B5/8/QK3k2 b - - 1 1	-2	1-0	7	3	3	0	A 7-ply line does not appear automatically
—	p3	4-2	KRPPKR	3k4/4r3/6K1/8/8/8/2PP3R/8 w - - 0 32	2	1-0	1	1	?	yes	Any P-push wins: none given depth 1m
A	a1	2-3	KPKBB	3k4/P3b3/8/8/8/4K3/8/2b5/8 w - - 14 8	2	1-0	5	3	2	-1	Reported depth (moves) = correct -1
"	a2	"	"	3k4/P3b3/8/8/8/5K2/2b5/8 b - - 15 8	-2	1-0	4	2	1	-1	Reported depth = correct -1
"	a3	"	"	3k4/P3b3/8/8/8/5K2/8/3b4 w - - 16 9	2	1-0	3	2	1	-1	Reported depth = correct -1
"	a4	"	"	3k4/P3b3/8/8/8/8/6K1/3b4 b - - 17 9	-2	1-0	2	1	1	0	Correct because of 'no decrement'
"	a5	"	"	2k5/P3b3/8/8/8/8/6K1/3b4 w - - 18 10	2	1-0	1	1	3	+2	3m is the length of the next phase
E	e	3-2	KRPKP	6R1/P7/1k6/8/8/8/p2K4/8 b - - 0 1	-1	'1-0'	1	0	51	+1	The extra '50' corresponds to value = -1
N	r1	2-4	KQKBBN	8/bb6/5Q1K/2n5/8/6k1/8/8 w - - 85 44	1	'1-0'	5	3	53	0	As above, '53' ⇒ 'value 1, depth 3m', ok
"	s	"	"	8/bb6/7K/2n5/8/6k1/8/Q7 b - - 86 44	-1	'1-0'	4	2	52	0	Correct
"	t	"	"	1b6/1b6/7K/2n5/8/6k1/8/Q7 w - - 87 45	1	'1-0'	3	2	51	-1	Not consistent with the '5 ply to go' depth
"	t1	"	"	1b6/1b6/7K/2n5/8/6k1/8/6Q1 b - - 88 45	-1	'1-0'	2	1	51	0	Correct
"	u	"	"	1b6/1b6/7K/2n5/8/5k2/8/6Q1 w - - 0 46	1	'1-0'	1	1	62	+61	62m is the length of the next phase
ZB	zc	3-2	KBNKP	8/8/2K3B1/8/N7/8/kp6/8 b - - 6 4	-1	'1-0'	1	0	55	+55	55m is the length of the next phase
ZF	zf	3-2	KNNKP	8/8/1N6/p7/8/4N3/8/K1k5 w - - 0 1	2	1-0	86	43	43	0	Correct. 1. Na4′′′′
	zf2	"	"	8/8/8/p7/N7/4N3/8/K1k5 b - - 1 1	-2	1-0	85	42	42	0	Correct, unlike as with pos. *zh2*
ZH	zh	3-2	KNNKP	K7/N7/k7/8/3p4/8/N7/8 w - - 0 1	1	'1-0'	164	82	82	0	Correct
"	zh2	"	"	K7/N7/k7/8/1N1p4/8/8/8 b - - 1 1	-1	'1-0'	163	81	82	+1	Error, unlike as with pos. *zf2*
"	zh3	"	"	K7/N7/1k6/8/1N1p4/8/8/8 w - - 2 2	1	'1-0'	162	81	81	0	Correct, c/o decrement after loser's move
ZJ	zj	3-2	KNNKP	8/8/4N3/8/7p/5k1N/8/K7 w - - 0 1	1	'1-0'	120	60	60	0	Correct. 1. Nef4′
"	zj2	"	"	8/8/8/8/5N1p/5k1N/8/K7 b - - 1 1	-1	'1-0'	119	59	60	+1	Error, as with pos. *zh2*
"	zj3	"	"	8/8/8/8/5N1p/4k2N/8/K7 w - - 2 2	1	'1-0'	118	59	59	0	Correct, c/o decrement after loser's move

Table 2. Positions associated with the FRITZ14 GUI's reporting of DTZ$_{50}$′ depths.[3]

Chessbase have now removed the bug in the FRITZ14 interface to the de Man DTZ$_{50}$′ EGTs (de Man, 2013a/b, CPW, 2013a/b) whereby the advertised depth was only decremented by one move per four ply for depths greater

[3] The line and position designations conform to those previously published (Haworth, 2014a).

than 50 moves (Haworth, 2014a). From position *p1*, also mentioned by Vlasák (2014), in the line **1. Ka2 Qa6+′ 2. Kb2 Qf6+′** (position *p1* again), the once apparently optimal *Ka2* and *Kb2* are now correctly shown to be sub-optimal. A four-ply loop like this should not now happen. The GUI is therefore more useful and leads the enquirer more reliably down a DTZ_{50}'-optimal path. However, there are still residual problems.

Chessbase seems to be maintaining the good principle of stating depth to the winning-goal but continues to do so in winner's moves, as with the Nalimov EGTs. This intrinsically loses information, still leaving the possibility that a one-ply suboptimal move appears optimal. The 7-ply win from position *p2* may not be found first time as it is easy to follow sub-optimal moves. After **1. … Ke2′ 2. Rf5′**, **Kd1** is one such move. **2. … Kd1 3. Qd8+′ Ke2° 4. Qd2#′′** is 6 ply whereas **2. … Kd3′ 3. Qd8+′ Ke3′ 4. Qd3+′ Kxd3°** is 7 ply.

The main issue though is a 'one out' problem, familiar to all programmers. The algorithm for converting from ply of depth to moves is simply stated. If the number of ply remaining, *pr*, is odd, division by two needs to be followed by rounding up or down, depending on whether it is winner or loser to move. The implementation however may have been complicated (a) by the fact that de Man only supplies the smaller half of each DTZ_{50}' EGT and (b) by the new 5-way position evaluation scale[4] *v* even though |*v*| is not required by the algorithm. Depth-indication errors occur whether the number of ply remaining is odd or even, for all values of *v*, and whether the attacker or defender plays the last ply: Table 1 provides some examples.

Further problems arise at the end of a phase of play when only a few ply remain. With one ply to go, the reported depth seems to relate consistently to the next phase rather than saying '1' or '0'. Although this situation should not mislead the alert observer, Nunn's KRPPKR position *p3* results in the FRITZ14 GUI listing the options in a confusing and not quite explicable order with **1. c4/d3/d4 (**depth '3') ahead of **1. Kf6** (depth '1') and **1. c3** (depth '4'). All P-pushes win in 1 ply while **1. Rh8+ Kd7 2. Rh7 K~ 3. Rxe7** is the obvious win. The errors when two or even three ply from the end of phase are not always consistent with those earlier in the phase (q.v., positions *a2* and *a4*, *r1* and *t*), and may be caused by the absence of half of each DTZ_{50}' EGT.

These phenomena, currently associated with the DTZ_{50}' depths reported by the FRITZ14 interface, are mentioned here for the sake of completeness and to reduce the probability of error when attempting to extract the maximum of information from a position. The DTZ_{50}' EGTs are very welcome and useful for most purposes but care is needed on occasion. Hopefully, Chessbase will soon be able to resolve these residual problems. My thanks to John Beasley, Noam Elkies and Harold van der Heijden for discussion of stalemate, particularly to Noam on mutual stalemate and the null move. Thanks also to John Nunn for confirming that some erroneous DTZ_{50}' depths seen on my computer were also seen on his.

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[4] Of the 5-values of the DTZ_{50}' metric, '2' is an unconditional win and '1' is a '50-move-frustrated' win.