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CHESS ENDGAME NEWS

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This note includes some endgame reflections on the last World Chess Championship, an update on the search for the longest decisive games between computers, and a brief mention of the sets of endgame table (EGT) statistics recently received from Yakov Konoval (2013) and from Victor Zakharov (2013) for the Lomonosov team.

Following hard on the heels of Nunn's (2013) review of instructive errors in the analysis of KRPPKRP, Carlsen-Anand, FCWM 2013 game 5, arrived at this very ending with position 53w, 8/8/8/2p1k3/P6R/1K6/6rP/8 w. The Lomonosov EGTs say 'mate in 33m' starting **53. a5'''** (only winning move) **Kd6'** (equi-DTM-optimal) **54. Rh7''** (unique optimal) **Kd5'' 55. a6'''' c4''**, all duly played. After **56. Kc3 Ra2'' 57. a7''**, Black hastened the end with **57. ... Kc5** (-8m; Ra4'') and resigned after **58. h4''**. A likely continuation was the DTM-optimal 59. h5' Ra3' 60. Kc2' c3' 61. h6' Ra2'' 62. Kxc3' with a new Queen coming onboard around move 70.

Anand later defined game 5 as a turning point in the match, and immediately went two down after game 6 where he strayed in a 10-man R-endgame with **60. Ra4?** and resigned with nine men on the board. Game 10 ended in KKN with bare Kings alongside an echo of Carlsen's Knight sacrifice. Needing only a draw, he had untypically ignored a somewhat more promising line at 8/1p2k3/p3pN1p/P1K2pp1/2P2P2/1P2n1PP/8/8 w: 46. Nh5 Kf7 47. Kb6 Kg6 48. Kxb7 Kxh5 49. c5 gxf4 50. gxf4 e5 51. c6 exf4 52. c7 f3 53. c8=Q f2 54. Qe8+ Kh4 55. Qxe3 f1=Q 56. Qxh6+ Kg3° 57. Qxa6 Qxa6+ 58. Kxa6 {**KPPPKP**, =} f4 59. Kb6 f3 60. a6 f2 61. a7 f1=Q 62. a8=Q {**KQPPKQ**, =} Qf2+ 63. Kb5 Qe2+ 64. Kb4 Kxh3 {**KQPKQ**, =} 65. Qc8+ =.

Carlsen points out that computers and computer databases have made opening theory more widely available, levelling the initial playing field and leading to only marginal advantage in the middlegame by the first time-control. If so, we may look forward to many more games where subtle advantages are accumulated slowly and result in a display of fine endgame technique and a hard-earned victory.

Hernandez (2013) notes some decisive computer games which nudge up the length-records (Haworth, 2013a/c) and/or break the record for games extended by DTM-minimaxing play inferred from available EGTs:

- a) STRELKA -v- SCORPIO (2013-04-09, E15): ending at KQPPKQN position 301w, theoretically drawn: the indicated '0-1' result may be an error, another reason to ignore a long game as a record-holder,
- b) NAUM_4.2 -v- TORNADO_4.25 (2011-01-08, A84): ending at KPPKPP position 300w (*dtm* = 15m): thus, the extrapolated length (to mate) from p300w is 314m/627p,
- c) HOUDINI_3_PRO -v- KOMODO_6 (2013-06-11, D23): ending at KQRKQP p296b (*dtm* = -36m): the extrapolated length (to mate) from p296b is 332m/663p.

It seems clear that there has been and perhaps still is a ceiling imposed by technology, including that of Chessbase, which makes it difficult if not impossible to record games of more than 300 moves. A pity, as they have surely been played between computers and may be classic battles with interesting endgames.

Yakov Konoval (2014) has filed three sets of Depth to Conversion (DTC) statistics with the author:

- a complete set of statistics for the 645 'White win' EGTs of 6-man chess:²
n.b., the maxDTC 6m decisive position is not in KRNKNN but a KRRPKQ loss in 486 plies,
- statistics for 'White win' 7m chess covering all 680 P-less and 460 of the 1,070 P-ful EGTs³ and
- statistics for a further 285 7m sub-endgames with specific square-colour profiles for the Bishops.

The EGTs themselves are not available via a query-service on the web and his work with Marc Bourzutschky, dating from 2004, deserves to be more available and better known. This journal has frequently reviewed the results they have highlighted in some six articles in *EG*, the endgame studies magazine.

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² 295 P-less and 350 P-ful EGTs, with the usual caveat - positions with non-null castling rights not included.

³ There are 140 5-2, 200 4-3, 210 5-2p and 325 4-3p endgames. The caveat here - P-promotion was restricted to P=Q.

Chess Endgame Records (CER) is an evolving, annotated dataset (Haworth, 2013b) and summarises, for example as in Figure 1, the known and candidate maxDTx records to date. It now includes the 6-man maxDTC records established by Konoval and the 7m maxDTM records established by the Lomonosov team (Zakharov, 2013). The Lomonosov DTM data reinforces the author’s belief (Haworth, 2013d) that there is a discernable trend in the growth of maxDTM as the number of men on the board grows. There are also confirmed and candidate DTC/Z records for some parts of 7-man chess.

The dataset is also a partial reconstruction of the history of EGT generation since the concept was first formulated (Bellman, 1964; Knuth, 1968). It notes record achievements of the past, many of which exploited the available technology of the time to the limit. Given that thirty years have produced computers with a million times more power and memory, it is easy to forget this.

m	w-b	DTC: depth in plies			DTM: depth in plies			DTZ: depth in plies		
		P-less	all	P-ful	P-less	all	P-ful	P-less	all	P-ful
3	2-1	KRK	KPK	KPK	KRK	KPK	KPK	KRK	KRK	KPK
		-32	-38	-38	-32	-56	-56	-32	-32	-20
4	2-2	KQKR	KQKR	KQKP	KRKN	KPKR	KPKR	KQKR	KQKR	KQKP
		-62	-62	-53	-80	85	85	-62	-62	-53
	3-1	KBNK	KBNK	KNPK	KBNK	KBNK	KPPK	KBNK	KBNK	KNPK
all		-66	-66	-44	-66	-66	-64	-66	-66	-26
		KBNK	KBNK	KQKP	KRKN	KPKR	KPKR	KBNK	KBNK	KQKP
		-66	-66	-53	-80	85	85	-66	-66	-53
5	2-3	KQKBB	KQKRP	KQKRP	KQKBB	KQKRP	KQKRP	KQKBB	KQKRP	KQKRP
		-142	157	157	-162	207	207	-142	151	151
	3-2	KBNKN	KNNKP	KNNKP	KBNKN	KPPKP	KPPKP	KBNKN	KNNKP	KNNKP
		153	228	228	213	-254	-254	153	164	164
4-1	KNNNK	KNNNK	KBBPK	KBNNK	KBNNK	KPPPK	KNNNK	KNNNK	KBBPK	
all		-42	-42	-32	-68	-68	-66	-42	-42	-24
	KBNKN	KNNKP	KNNKP	KBNKN	KPPKP	KPPKP	KBNKN	KNNKP	KNNKP	
		153	228	228	213	-254	-254	153	164	164
6	2-4	KQKBBN	KQKBNP	KQKBNP	KQKBBN	KPKBNP	KPKBNP	KQKBBN		
		125	-384	-384	-228	447	447	125		
	3-3	KRNKNN	KRNKNN	KQPKRB	KRNKNN	KRNKNN	KRPKNN	KRNKNN	KRNKNN	
		485	485	-272	523	523	505	485	485	
	4-2	KRRNKQ	KRRPKQ	KRRPKQ	KRBNKQ	KRRPKQ	KRRPKQ	KRRNKQ	KRRPKQ	KRRPKQ
	-202	-486	-486	241	-506	-506	-202	383	383	
5-1	KBBBNK	KBBBPK	KBBBPK				KBBBNK			
all		-27	-31	-31				-27		
	KRNKNN	KRRPKQ	KRRPKQ	KRNKNN	KRNKNN	KRRPKQ	KRNKNN	KRNKNN	KRRPKQ	
		485	-486	-486	523	523	-506	485	485	383
7	2-5	KQKBBBB	? KQKBNPP	? KQKBNPP	KQKRBNN	KQKBBNP	KQKBBNP	KQKBBBB		
		131	-202	-202	239	-486	-486	131		
	3-4	KQNKRBN	? KQNKRBN	? KRKBKBNP	KQNKRBN	KQPKRBN	KQPKRBN	KQNKRBN	? KQNKRBN	
		-1,034	-1,034	-412	-1,090	1,097	1,097	-1,034	-1,034	
	4-3	KQBNKQB	? KQBNKQB	? KRNPKRBB	KQBNKQB	KBNPKBP	KBNPKBP	KQBNKQB	? KQBNKQB	? KRNPKRBB
	-660	-660	529	-690	691	691	-660	-660	519	
5-2	KBNNNKQ	? KNNPKQ	? KNNPKQ	KBNNNKQ	KRBBPKQ	KRBBPKQ	KBNNNKQ			
	-448	461	461	-464	799	799	-448			
all	KQNKRBN	? KQNKRBN	? KRNPKRBB	KQNKRBN	KQPKRBN	KQPKRBN	KQNKRBN	? KQNKRBN	? KRNPKRBB	
	-1,034	-1,034	529	-1,090	1,097	1,097	-1,034	-1,034	519	

Figure 1. maxDTx wins for White (Haworth, 2013b), ‘-’ indicating ‘loser to move’.

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