

## The hardest sudokus (new thread)

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Re: The hardest sudokus (new thread)

Dby champagne • Mon Dec 06, 2010 3:53 pm

14 Mauricio wrote:

14 champagne wrote:  
2) try without the given in excess  
. either you solve it now and find the given in the solution, **the puzzle was not minimal**  
. or you fail and then you look for something else.  
...

Counterexample to point 2

CODE: SELECT ALL  
.....1..2..3..4..5..6..7..8...1...2...4..9..1..7..1...6..5..7....8..6...9..2...3...4  
Minimal, not symmetric, remove 1@r5c4 (now multisolution, but symmetric), solve it (assuming uniqueness, wrongly), and you have r5c4=1 in the solution.  
  
Now, if you remove one clue, giving it symmetry, solve it, and if the solution is not consistent with the original puzzle, then you now the clue you erased was not redundant; in other words, redundancy allows you to erase a clue, but IMO it is not easier to know if a clue is redundant than to solve the puzzle.

14 eleven wrote:  
The puzzles all have ER >= 11.2 and q2 > 98000, i applied the new filter additionally.  
But i know better now, how to select puzzles for you.

I have always been testing minimal puzzles for difficulty ... Your search for a "Hardest" non minimal puzzle would be exploring uncharted waters.

tarek

Re: The hardest sudokus (new thread)

Dby eleven • Wed Dec 08, 2010 10:23 am

Champagne,  
  
i have made a new filter now. Can you find a hard one in this sample ?  

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Re: The hardest sudokus (new thread)

Dby champagne • Wed Dec 08, 2010 12:13 pm

This is a very homogeneous lot. Very close as well of the primary selection I am doing.  
  
I just erased a small number of puzzles I would not have taken.  
  
Most of these puzzles have an EXOCET or a "Quasi EXOCET" pattern.  
All are solved using the 2 cells AC2, not more  
  
Sometimes the EXOCET pattern works well, sometimes not, so about 20 of them are still very hard, even using the EXOCET property.  
  
Difficult to predict the SE rating, but from my experience in the pattern game, you have the best chance to find high ratings in the top of the below list.  
  
I would bet for the best ones in the range 10.5-11.5 and not many below 10.0 , but this is in the field I explored. You came with surprising results.

champagne

I think your hardest is in that short list

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and here is a near complete list sorted to have in the top the highest SE ratings

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Re: The hardest sudokus (new thread)

Dby eleven • Wed Dec 08, 2010 1:32 pm

Thanks,  
  
the puzzles all have ER >= 11.2 and q2 > 98000, i applied the new filter additionally.  
But i know better now, how to select puzzles for you.

Re: The hardest sudokus (new thread)

Dby tarek • Wed Dec 08, 2010 1:42 pm

14 eleven wrote:  
The puzzles all have ER >= 11.2 and q2 > 98000, i applied the new filter additionally.  
But i know better now, how to select puzzles for you.

Re: The hardest sudokus (new thread)

Dby eleven • Wed Dec 08, 2010 2:39 pm

I dont search for non minimal hardest puzzles, i just dont test for minimality in the moment 😊  
This can be done later easily, i will not change the basic ER rating in almost all cases, but lower the other two.

Re: The hardest sudokus (new thread)

Dby champagne • Wed Dec 08, 2010 3:02 pm

hi eleven,  
  
From my experience, the right cut off to catch all "hardest puzzles" should be lower than 11.2 my last "hardest" had only a rating 10.8.  
10.6 would be I think a good cut off.

champagne

Re: The hardest sudokus (new thread)

Dby tarek • Wed Dec 08, 2010 3:22 pm

14 champagne wrote:  
From my experience, the right cut off to catch all "hardest puzzles" should be lower than 11.2 my last "hardest" had only a rating 10.8.  
10.6 would be I think a good cut off.

When we were attempting the generation of "Hardest puzzles" 3+ years ago. We used to hit a brick wall with SE at the 10.6 mark. That is why JPF at the time collated the posted puzzles with a 10.6+ rating.

This reminded me of that time in the ancient past when Ocean hit that 10.0 mark for the 1st time 😊. How far back did the goal posts move 😊

tarek

Re: The hardest sudokus (new thread)

Dby champagne • Wed Dec 08, 2010 3:58 pm

14 tarek wrote:  
14 champagne wrote:  
From my experience, the right cut off to catch all "hardest puzzles" should be lower than 11.2 my last "hardest" had only a rating 10.8.  
10.6 would be I think a good cut off.

When we were attempting the generation of "Hardest puzzles" 3+ years ago. We used to hit a brick wall with SE at the 10.6 mark. That is why JPF at the time collated the posted puzzles with a 10.6+ rating.

This reminded me of that time in the ancient past when Ocean hit that 10.0 mark for the 1st time 😊. How far back did the goal posts move 😊

tarek

We are speaking here of a cut off to analyze puzzles, not for a final publication. But may be we should have that discussion in another thread.

Reversely, frankly I don't believe at all we can rely on SE rating alone to extract hardest puzzles.

I did not publish many puzzles up to now and I have in cache some puzzles that would be eligible with your 11.2 filter, but they have nothing attractive on my view.  
(and I don't see a rush to enter new puzzles) 😊😊

Anyway, I don't want to be a source of trouble and if you think it's better, we open a separate thread

champagne

Re: The hardest sudokus (new thread)

Dby tarek • Wed Dec 08, 2010 4:52 pm

14 champagne wrote:  
We are speaking here of a cut off to analyze puzzles, not for a final publication. But may be we should have that discussion in another thread.  
I was only confirming your suspicions through our attempts back in 2006/2007

14 champagne wrote:  
Reversely, frankly I don't believe at all we can rely on SE rating alone to extract hardest puzzles.  
I think it was said before that SE ratings >=9.5 are difficult to judge because all available solvers will go to T&E at this stage: q1, q2, Sx9 & Sxt all have flaws ... There is a chance that we are excluding puzzles with SE>=9.5 from the hardest list.14 champagne wrote:  
I did not publish many puzzles up to now and I have in cache some puzzles that would be eligible with your 11.2 filter, but they have nothing attractive on my view.  
As far as I'm concerned, this thread is to discuss the "Hardest puzzles" ... Discussions, Posted puzzles & ratings should NOT be limited by the filters I'm employing.  
If you suspect that you have the hardest puzzle in a group of puzzles then feel free to post them.

tarek

Re: The hardest sudokus (new thread)

Dby eleven • Thu Dec 09, 2010 8:21 pm

Here is one for the q2 list 😊  

CODE: SELECT ALL  
99450 .2.4.....4...92...98.....4...6...75...1....4...38..3.....6...7....1..4..85.. Green Glasses

This grid only has 2 strong links (but a low 10.x ER)

CODE: SELECT ALL  
.....3.....8..4.....7..3...4...6...8...6.5.2.9...7..1...6.8.9..2..7...6...8..1.....5.  
12569 259 3	1247 24579 145879	15679 8 12579
4 259 125689	1278 25789 156789	135679 12367 123579
125689 7 125689	128 3 15689	1569 126 4
12359 23459 12459	6 479 3479	8 12347 12357
139 6 149	5 478 2	1347 9 9 137
23589 23459 7	348 1 3489	345 234 6
356 8 456	9 457 13457	2 13467 137
7 23459 2459	1234 6 1345	1349 134 8
2369 5 2469	23478 2478 3478	34679 5 979
14 champagne wrote:		
All are solved using the 2 cells AC2, not more

Still I dont know, what AC2 really is and i did not find a definition in this forum. Can you point me to one please and demonstrate an AC2 move in this grid (#9 in my list), so that we can see, how complex it is ?

CODE: SELECT ALL  
.....1.....23478 23478 | 3467 5 678 | 2467 368 9 |  
2348 5 6	13479 13489 1789	1247 138 12348
348 3478 9	2 1348 1678	14567 13568 13458
234589 1 23458	359 6 259	459 589 7
35689 3789 3578	13579 139 4	1569 2 158
24569 2479 2457	8 129 12579	3 1569 145
234589 23489 1	459 7 2589	259 359 6
7 2389 2358	1569 1289 125689	1259 4 1235
2459 6 245	1459 1249 3 9 7 125	
14 champagne wrote:		
All are solved using the 2 cells AC2, not moreI have uploaded 5000 puzzles to zippy share [3sudoku.zip](#). They all passed 3 filters, which throw out 90 % of the known hardest including swampy oil and Mauricio's puzzle, but probably dont have a very high ER. Maybe you can find something in this set.

Re: The hardest sudokus (new thread)

Dby tarek • Thu Dec 09, 2010 9:45 pm

14 eleven wrote:  
Here is one for the q2 list 😊  

CODE: SELECT ALL  
99450 .2.4.....4...92...98.....4...6...75...1....4...38..3.....6...7....1..4..85.. Green Glasses

Hi eleven,  
Good catch ... Unfortunately I think it is a non minimal isomorph of Fata Morgana .... This will happen often when your search widens.  
  
My tedious task will also check if the puzzles posted here have been posted before ... Your non minimal puzzles have to be minimized then checked 😊  
I have already a database with top lists of the past & submissions from coloin to check against but it will require updating with new puzzles submitted here.

tarek

Re: The hardest sudokus (new thread)

Dby eleven • Thu Dec 09, 2010 11:34 pm

Wow, i really found an old one from random puzzles ? What a surprise !

Re: The hardest sudokus (new thread)

Dby champagne • Fri Dec 10, 2010 11:38 am

14 eleven wrote:  
14 champagne wrote:  
All are solved using the 2 cells AC2, not more

Still I dont know, what AC2 really is and i did not find a definition in this forum. Can you point me to one please and demonstrate an AC2 move in this grid (#9 in my list), so that we can see, how complex it is ?

You should find a detailed answer either in that thread

full-tagging-15624.html

or on my website, but let me answer briefly.

My main process is a search of AIC's and AIC's nets to eliminate candidates.

CODE: SELECT ALL  
level 1: strong links and weak links generated from rows/columns and boxes including groups.  
level 2: AHS are added with new strong generated and new weak links.  
level 3: are added row/ columns or boxes patterns in which 2 digits are "unknown" to solve it each possible solution (a couple of digits in 2 groups) is a super-candidate.  
These super-candidates are eliminated in the same way as candidates.  
2 kinds of new patterns are considered  
2 cells 3 digits giving 3 super candidates  
AC2 defined as (n cells n+2 known digits 4 free digits) and 6 "super candidates";  
the smallest AC2 is made of 2 cells 4 digits and no known digit (group)In the last version of my solver (still bugged at the last level but I had no time to fix the bug), I defined a level 3.1 using only the smallest AC2.  
. I thought and this is verified that most puzzles would be solved just using these ones  
. They are much easier to see for a player.  
. Last but not least, EXOCET patterns have such an AC2 as base, and the SK loop is solved just using them.

You can find examples of solutions using AC2 on my website;

champagne

Re: The hardest sudokus (new thread)

Dby coloin • Fri Dec 10, 2010 9:32 pm

14 eleven wrote:  
Wow, i really found an old one from random puzzles ? What a surprise !

well a while back i was generating 21-clue puzzles and passing them on to **champagne** - and it was pleasing to see his solver and subsequent rater program advancing.

it seemed I was generating puzzles which just happened to give high ratings with -q2 and sxt/sx9 and these were the best that i got some time ago, just making the criteria.

CODE: SELECT ALL  
3149 , 1115 , .....2.....49.2.9..7.....8...5...1.6...3.4...7..1..7...87..5.3..4.3.....# 970166 FNPB C21.m/K3.625.850  
3584 , 2812 , .....3.....5.4..8.1.....7.9..8.....94.6.5.62.....3.6.9..4...7.2.1.# 970803 FNPB C21.m/K2.5.22304  
5908 , 1212 , .....871.....9..6.9.5...8.6..5.....23...4...6...9.3..5.4...3.....7...# 96665 FNPB C21.m/K2.10.4592

It was also unclear which puzzles to pick to continue to advance with a {-2+2} process - pick the hard ones or perhaps the not so hard ones ????? It is impossible to know how extensive or complete the trawl was I

The 22-clue search gave many more puzzles per {-2+2} and was more protracted. I think I gave up.

anyhow

just noticed this thread [here](#)

it might be a more direct way of making hard puzzles.....

i made this non-minimal 27 clue puzzle - by hand  
probably fairly easy to generate them  
the diagonal pattern and the clues in each box are not fixedCODE: SELECT ALL  
+---+---+---+  
3	.1	.9	.4	.
2	.7	.16	.	
..1	8	.1	.5	
+---+---+---+				
..6	3	.1	.7	
5	.1	.2	.6	.
4...1	9..19..			
+---+---+---+				
7..1..6	.1	.1		
..8	.5	.3	.1	
..9	.4	.1	.2	.
+---+---+---+  
instead of easy it was a bit hard SE 6.8/6.8/6.8  
removing clues - probably going to be harder still - and there will be many puzzles .CODE: SELECT ALL  
3....9.4..2..7.6....1.....5..63.....5..2....4....19..7....6..1..8.5.3....4...2.# SE#9.2/9.1/9.0

If we can generate a non-minimal 27 clue with SE 9.0 - there will be many harder puzzles generated im sure.

C

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