

The hardest sudokus (new thread)

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Quads backdoors

Day dobrichev • Wed Jul 18, 2012 5:56 pm

dobrichev2016Supporter

Posts: 1831Joined: 24 May 2010

rank wrote:

Andrew Stuart has proposed the number of *quads* backdoors of maximum size as a [new metric for difficult puzzles](#).

"Quads backdoors" means, in addition to the backdoors guesses, the techniques used are singles, locked candidates, naked and hidden subsets (pairs, triples, and quads).

The best I found in this proposal is the analogy with fish-hooks. The weaker the hook is, the larger numeric symbol is used. Stronger than "0" are hooks "00", "000", etc.

Usability of such a system highly depends on the family of the "basic" techniques used.

From the perspective of the solver it is an estimation of wrong guess expectation rate. But guessing usually is made on "best" candidates, where best are bi-value cell and/or bi-position digit in house(s). IMO counting only the "best" guessing candidates takes more sense. Further, the rating could be scaled according to whether 2/3/4 value/position is the best available at respective guessing level. Further, the "right" and "wrong" guess could have much different continuation paths and if uniqueness is not assumed then both subtrees must be estimated.

Probably some of the popular rating systems use similar approach but with different "basic" techniques family?

Re: The hardest sudokus (new thread)

Day champagne • Fri Jul 20, 2012 1:49 am

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

This is an update of an original post published Sat Oct 15, 2011 12:15 pm

The only change in that post is that 11 puzzles disappeared after multi fish patterns have been found;

The data base has meantime more than doubled, I'll make ASAP an update of that list

=====

This is my current short list of potential hardest.

The list has not changed that much since the last post despite the fact that the database has now more than 18000 puzzles.

The link to my website will be updated soon.

The main changes come from a lower cut off.

The puzzle 5416 formerly in the list has been cleared after a multi fish has been shown.

The items in the list are

puzzle;
seq number in my database
Family code
Id code in the family (could be the name)
ER (serate)
EP
ED
code 9 to 1 (see below)
most promising floor group
index of difficulty (print size) found by my solver

The code 9 to 1 gives an idea of the chances for the puzzle to stay in the list

9 no evidence of a potential in a multi floors "Allan Barker mode" approach
1 good chance to find a multi floor pattern not seen by my solver

In between, I made the choice regarding potential eliminations
Most of the puzzles having a low "code" should be discarded later;

champagne

Hidden Text: Show

Re: The hardest sudokus (new thread)

Day Leren • Sat Jul 21, 2012 6:00 am

Leren

Posts: 4352Joined: 03 June 2012

I ran Champagne's latest list of potential hardest puzzles through my solver and found almost Multifish patterns in all but 4 of them.

The table below compares the floors I found with Champagne's

most promising

floors - at the moment I only use 4 digit floors
so the agreement isn't too bad. I also found Exocet's in puzzles 35, 14596 and 12120.

Leren

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Re: The hardest sudokus (new thread)

Day Leren • Sat Jul 21, 2012 6:14 am

Leren

Posts: 4352Joined: 03 June 2012

That last post was my first ever in a forum and I got a bit too clever for myself with the hidden text.

Hopefully the table will be readable this time.

Leren

Puzzle Champagne Leren
4024 - 3459
3411 - -
889 - 2467
7417 - -
10216 - 1236
1362 - 2345
243 23459 2345
620 12348 1248
2780 12457 1689
2051 13456 -
35 1234 1234
3909 1579 -
14596 1236 1236
1102 12567 1567
4993 1578 1578
12120 1236 1236

[rank-moderator edit: reply and follow-on discussion moved [here](#)]

Re: The hardest sudokus (new thread)

Day champagne • Wed Jul 25, 2012 3:19 pm

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

There has been a lot of activity on that topic and I can have missed some findings.

This is the status of my old list of potential hardest I have after the last updates (5 more cleared)

I am working on the next update of the data base.

The last step of the update will be to produce a revised list of these candidates for the "hardest puzzle" award

=====

This is my current short list of potential hardest.

The list has not changed that much since the last post despite the fact that the database has now more than 18000 puzzles.

The link to my website will be updated soon.

The main changes come from a lower cut off.

The puzzle 5416 formerly in the list has been cleared after a multi fish has been shown.

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In between, I made the choice regarding potential eliminations
Most of the puzzles having a low "code" should be discarded later;

champagne

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Re: The hardest sudokus (new thread)

Day champagne • Fri Jul 27, 2012 3:14 pm

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

last update of the data base of potential hardest is available

The link is unchanged

[here](#)

The data base has now 38 106 puzzles

Analysis of specific properties has been done for all puzzles except symmetry of given for part of them

many files have changed after the work done on exotic patterns

nearly 95% of the puzzles have now an identified exotic pattern.

Is included in the file my updated list of candidates that could be the hardest

champagne

Re: exocet pattern in hardest puzzles

Day da95376 • Sat Jul 28, 2012 1:31 am

da953762014Supporter

Posts: 2624Joined: 15 May 2006

File "04b Jexocet.txt" contains the puzzles that champagne's solver considers to be JExocet puzzles. However, 426 of these puzzles aren't found by my QExocet analyzer -- which should find all JExocet puzzles. Consider the first JExocet in this puzzle:

CODE: SELECT ALL
.....1.....234...1..2..56...3..4..2...5...7...8...9.....6...3..1...7...5....9...8.....;32943;dob;2012_04;2
;r1c7 r1c8 r2c1 r3c1 r2c5 r3c5 789
;r1c7 r3c7 r5c8 r5c9 r9c8 r9c9 789;;
b5 Naked Quad <=> 1568 r5c4,r6c5
b7 Naked Quad <=> 2458 r8c1,r9c2
.....+
234567 234569 245789	34567 34689 56789	8789 8789 1 1
Q567 689 5789	1567 R1689 156789	2 2 3 4
Q347 3489 1 1	347 R3489 2	789 5 6
.....+		
167 169 3	156 168 4	156789 2 5789
1246 5 9	23 7 168	134689 4689 389
8 1246 247	9 23 156	134567 467 357
.....+		
245 248 6	247 249 3	45789 1 25789
13 7 248	1246 5 169	34689 4689 2389
9 13 245	8 1246 167	34567 467 2357
.....+
163 eliminations remain

There's an sk-loop, which always produces more exclusions than an exocet. I suspect a bookkeeping error.

CODE: SELECT ALL
16 Truths = {5789R4 5789R7 5789C3 5789C6}
16 Links = {1203 1206 4707 4709 5057 7048 8057 0048}
9 Eliminations --> r12c6<6, r1c3<24, r4c7<16, r2c6<1, r7c9<2, r7c7<4

Re: exocet pattern in hardest puzzles

Day Leren • Sat Jul 28, 2012 4:49 am

Leren

Posts: 4352Joined: 03 June 2012

I also don't see Exocets in puzzles 32943 and 32942 in Champagne's new 04b Jexocet.txt file.

Another query relates to the following, a bit further on in the same file.

.....7..4..83..1..3..6...9..4.....9..8..2...5...2...6...4...1..38..4..7.....5..;205;tanx;tan0077;2;r6c4 r6c5 r4c1 r5c1 r4c7 1367/r4c5 r6c5 r2c4 r8c5 1567;;

The 1567 Exocet is OK but the first one looks spurious - in fact r4c1 = 2 and r5c1 = 4

Leren

Re: exocet pattern in hardest puzzles

Day champagne • Sat Jul 28, 2012 5:42 am

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

rank wrote:

da95376 wrote:

Champagne released his latest version of "Hard11.zip".

File "04b Jexocet.txt" contains the puzzles that champagne's solver considers to be JExocet puzzles. However, 426 of these puzzles aren't found by my QExocet analyzer -- which should find all JExocet puzzles. Consider the first JExocet in this puzzle:

CODE: SELECT ALL
.....1.....234...1..2..56...3..4..2...5...7...8...9.....6...3..1...7...5....9...8.....;32943;dob;2012_04;2

There's an sk-loop, which always produces more exclusions than an exocet. I suspect a bookkeeping error.

Re: exocet pattern in hardest puzzles

Day Leren • Sat Jul 28, 2012 5:59 am

rank2012Supporter

Posts: 4764Joined: 02 November 2005Location: Southeastern USA

There's an sk-loop, which always produces more exclusions than an exocet. I suspect a bookkeeping error.

CODE: SELECT ALL
16 Truths = {5789R4 5789R7 5789C3 5789C6}
16 Links = {1203 1206 4707 4709 5057 7048 8057 0048}
9 Eliminations --> r12c6<6, r1c3<24, r4c7<16, r2c6<1, r7c9<2, r7c7<4

Re: exocet pattern in hardest puzzles

Day champagne • Sat Jul 28, 2012 5:42 am

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

rank wrote:

da95376 wrote:

Champagne released his latest version of "Hard11.zip".

File "04b Jexocet.txt" contains the puzzles that champagne's solver considers to be JExocet puzzles. However, 426 of these puzzles aren't found by my QExocet analyzer -- which should find all JExocet puzzles. Consider the first JExocet in this puzzle:

CODE: SELECT ALL
.....1.....234...1..2..56...3..4..2...5...7...8...9.....6...3..1...7...5....9...8.....;32943;dob;2012_04;2

There's an sk-loop, which always produces more exclusions than an exocet. I suspect a bookkeeping error.

Re: exocet pattern in hardest puzzles

Day Leren • Sat Jul 28, 2012 6:08 am

Leren

Posts: 4352Joined: 03 June 2012

Champagne,

I've found other oddities in your Jexocet file

for example:

.....35.....1..9..5..6...8..3...6..7...2...1..4.....3..8..9..2..7..8.....4.....;7594;col;H437;2;r2c7 r2c8 r3c2 r1c2 r1c5 2478/r1c7 r2c7 r4c8 r7c9 1247;;

and

.....354.....6...3..6..8...8..9..6..1..2...7..4.....9..3..5..2...1.....7...9...;2983;col;H178;2;r2c7 r2c9 r3c2 r1c2 r3c4 r1c4 1279/r1c7 r2c7 r4c8 r7c9 1247;;

In each case the first Exocet does not resolve properly.

I'd also take a look at 5099, 1501 & 1504.

Leren

Re: The hardest sudokus (new thread)

Day champagne • Sat Jul 28, 2012 11:14 am

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

I am somehow lost with posts moved here and there.

I confirm I found not one, but 2 bugs in my code with the example given on puzzle 32943

Meantime I had to take care of my lobster pots and fishing net.

I should find the time to fix them properly to-day or to morrow and to re do the Jexocet process.

I'll then update the file to ease the cross checking process.

EDIT1 first result to check, I lost 483 puzzles compared to 426 missing in danny's process

EDIT2 all the puzzles shown above have been fixed.

I prepare an update of the file limited to the file 04b Jexocet

The other data will be updated in the next revision that should take place in about one and half month and include some 25 clues puzzles.

EDIT3 revision of the file done.

I noticed that in the previous one some files where likely missing (not included in the zip file)

Last edited by champagne on Sat Jul 28, 2012 1:20 pm, edited 3 times in total.

Re: The hardest sudokus (new thread)

Day rank • Sat Jul 28, 2012 12:38 pm

rank2012Supporter

Posts: 4764Joined: 02 November 2005Location: Southeastern USA

champagne wrote:

I am somehow lost with posts moved here and there.

Just doing my job. I'm sure you can see why posts triggered by a flawed "hardest sudoku" file are more appropriate here, rather than the exocet thread.

champagne wrote:

rank wrote:

There's an sk-loop, which always produces more exclusions than an exocet. I suspect a bookkeeping error. the puzzle is flagged as having a SK loop and a multi-fish pattern. I checked the process for Jexocets and got the same results. This is not a book keeping error, but seems to be a bug to find and fix.

"Bug" was my actual thought, but I thought "bookkeeping error" sounded kinder.

BTW a reply to my post was not necessary.

Re: exocet pattern in hardest puzzles

Day da95376 • Sat Jul 28, 2012 3:44 pm

da953762014Supporter

Posts: 2624Joined: 15 May 2006

CODE: SELECT ALL
98..7.....7.....9.....6.....5...4...3...2...98.....4...1..3...1..4...83...6.....2...3
;18238;GP;22ky5;1
;r3c1 r3c2 r2c4 r1c7 1234;;

.....+
9 8 12345	07 2456 1356	R1234 136 246
1 125 12345	Q12456 24568 13568	R9 1368 2468
B1234 B12 6	1249 2489 1389	123478 5 2478
.....+		
1569 4 4 157	1569 3 15679	578 2 56789
12356 12567 9	8 2567 1567	3457 367 4567
2368 2567 2357	2569 25679 4	3578 36789 1
.....+		
1245 12579 8	3 4579 579	6 379 2579
1456 15079 1457	4569 456789 2	1578 1789 3
.....+
184 eliminations remain

r3c1=3 => r6c3=3 => this grid ... where I can't force r1c7=3
. . -3	. . -3	73 3 .
. -3	. . -3	3 .
=3	. . -3	-3 -3
.....+		
. . . 3		
-3	. . -3	3 3 .
3 =3	. . -3	-3 -3
.....+		
. 3 .		
-3	. . -3	. . .
. . 3	. . -3	. . 3

Re: exocet pattern in hardest puzzles

Day champagne • Sat Jul 28, 2012 4:13 pm

champagne2017Supporter

Posts: 7269Joined: 02 August 2007Location: France Brittany

da95376 wrote:

There are 37 puzzles in the latest "04b Jexocet.txt" that my QExocet analyzer doesn't recognize. This is the first:

CODE: SELECT ALL
98..7.....7.....9.....6.....5...4...3...2...98.....4...1..3...1..4...83...6.....2...3
;18238;GP;22ky5;1
;r3c1 r3c2 r2c4 r1c7 1234;;

clearly another bug in my code for downgraded forms.

I'll look at that to morrow.

Do you have some not found by my solver in that Jexocet process??

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