The hardest sudokus (new thread)

Re: Re:

by champagne » Wed Sep 15, 2010 7:14 am

> **Mauricio wrote:**
> Here are two possible starts, though it would not be an interesting game.

Hi Maurice,

Agreed although I piled 7 such puzzles upon gsf request of new starts.
In fact, patterns of interest in the pattern game are generally not the best for "hardest puzzles".

Game 118 was nice to play, but a very small number of puzzles have the properties to enter the lowest part of my "hardests" database

champagne

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: Re:

by m_b_metcalf » Thu Sep 16, 2010 8:36 am

> **Mauricio wrote:**
> Here are two possible starts, though it would not be an interesting game.

Most certainly not. This pattern has form.

> **champagne wrote:**
> Agreed although I piled 7 such puzzles upon gsf request of new starts.
> In fact, patterns of interest in the pattern game are generally not the best for "hardest puzzles".
>
> Game 118 was nice to play, but a very small number of puzzles have the properties to enter the lowest part of my "hardests" database

Indeed. According to my statistics, only 27 submitted puzzles have ever exceeded the highest score in 118.

Regards,

Mike Metcalf

Last edited by m_b_metcalf on Thu Sep 16, 2010 10:46 am, edited 1 time in total.

m_b_metcalf
2017 Supporter
Posts: 13227
Joined: 15 May 2006
Location: Berlin

Re: Re:

by champagne » Thu Sep 16, 2010 10:43 am

> **m_b_metcalf wrote:**
> Indeed. According to my statistics, only 27 submitted puzzles have ever exceeded to highest score in 118.
> Regards,
>
> Mike Metcalf

I don't have the count, but I am sure this is correct.

Nevertheless, this is not enough to be in a good place in my database of hardests. I am currently rating that database with SE to have some relevant statistics. many many puzzles in that database are rated over 10.7.

Another point is the correlation between SE and other solving technics.
I am not a specialist of SE, I just rate to comply to the pattern game rule, but I red it does not consider groups. This could explain why the difficulty is seen so different in some cases.

In game 118, most puzzles rated over 10 are seen "relatively easy" by my solver.

A small group is requiring the last level of tagging (a list of such puzzles below, made 2 or 3 days ago)
What would be of interest with that pattern is to find non minimum puzzles giving subpuzzles with high ratings.
I am thinking of doing that if I can find the ressources (one way is to skip some games)

champagne

here some puzzles in game 118 requiring the last level of tagging

CODE: SELECT ALL
```
2..5...38......2.1.....356...4..91...7..8....9..3....2..9..4....8..7....5..9....6   10.7   10.6   9.9
3..2...14......2.5.....136...4..25...7..8....9..3....2..9..4....8..7....5..9....6   10.6   10.6   9.9
1..5...34......2.1.....356...4..91...7..8....9..7....5..2..4....8..7....3..9....6   10.6   10.6   10.6
8..9...14......9.8.....167...7..68...3..2....5..4....1..2..3....4..1....6..5....9   10.6   10.6   9.4
1..2...39......6.1.....325...4..71...8..9....7..6....2..3..5....9..4....8..7....6   10.6   10.6   9.4
6..5...24......5.8.....469...7..68...3..2....1..4....9..1..7....2..3....9..8....6   10.6   10.6   9.5
```

Just for fun, all these puzzles are harder than the "hardest ever found" seen some posts above

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by champagne » Wed Sep 22, 2010 2:41 pm

In the pattern game 119, all high ratings have the SK loop except one, found by gsf, the highest rating.

That one will undoubtly enter the data base of "hardest puzzles".

some comments on that puzzle

CODE: SELECT ALL
```
100000009040002080006000300000403070000060000020508000009000100080700040500000006  11.3/11.3/3.4  gsf
```

after basic eliminations, we come to that point.

CODE: SELECT ALL
```
1||1____ 357__ 28____ |368__ 34578_ 4567_ |24567 256__ 9_____
2||379__ 4____ 357___ |1369_ 13579_ 2____ |567__ 8____ 157___
3||28___ 579__ 6_____ |189__ 145789 14579 |3____ 125__ 12457_

4||689__ 1569_ 158___ |4____ 129___ 3____ |25689 7____ 1258__
5||34789 13579 134578 |129__ 6_____ 179__ |24589 12359 123458
6||34679 2____ 1347__ |5____ 179___ 8____ |469__ 1369_ 134___

7||23467 367__ 9_____ |2368_ 23458_ 456__ |1____ 235__ 78____
8||236__ 8____ 123___ |7____ 12359_ 1569_ |259__ 4____ 235___
9||5____ 137__ 12347_ |12389 123489 149__ |78___ 239__ 6_____
```

no SK loop, no EXOCET, no "rank0 logic"? (at least nothing found by my solver)
Nevertheless, one can find a nice loop at that point where the SK loop should stand.
Despite that nice loop and tight connection between box 3 and box 7, the solver failed in looking for an easy path.

The game is open.

champagne

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by ronk » Wed Sep 22, 2010 4:38 pm

> **champagne wrote:**
> In the pattern game 119, all high ratings have the SK loop except one, found by gsf, the highest rating.
> ...
> CODE: SELECT ALL
> ```
> 100000009040002080006000300000403070000060000020508000009000100080700040500000006  11.3/11.3/3.4  gsf
> ```
> ...
> no SK loop, no EXOCET, no "rank0 logic"? (at least nothing found by my solver)
> Nevertheless, one can find a nice loop at that point where the SK loop should stand.

Wow, an "SK-loop" with 5-layers ... instead of the classical 4-layers. [Not wishing to be disappointed too quickly, I didn't look for anything smaller.]

_____

20 Truths = {13569R2 13569R8 13569C2 13569C8}
20 Links = {45n2 2n4 28n5 8n6 56n8 1b37 3b179 5b139 6b37 9b19}
18 Eliminations --> r1c37<>5, r7c19<>3, r19c3<>3, r37c9<>5, r1c7<>6, r2c5<>7, r3c9<>1, r3c1<>9, r5c8<>2, r5c2<>7, r7c1<>6, r8c5<>2, r9c3<>1, r9c7<>9,

ronk
2012 Supporter
Posts: 4764
Joined: 02 November 2005
Location: Southeastern USA

Re: The hardest sudokus (new thread)

by champagne » Wed Sep 22, 2010 4:56 pm

> **ronk wrote:**
>> **champagne wrote:**
>> In the pattern game 119, all high ratings have the SK loop except one, found by gsf, the highest rating.
>> ...
>> CODE: SELECT ALL
>> ```
>> 100000009040002080006000300000403070000060000020508000009000100080700040500000006  11.3/11.3/3.4  gsf
>> ```
>> ...
>> no SK loop, no EXOCET, no "rank0 logic"? (at least nothing found by my solver)
>> Nevertheless, one can find a nice loop at that point where the SK loop should stand.
>
> Wow, an "SK-loop" with 5-layers ... instead of the classical 4-layers. [Not wishing to be disappointed too quickly, I didn't look for anything smaller.]

Congratulations ronk,

I don't call that a SK loop, but it is very close to, I agree.

Your SLG includes the nice loop (digits 2;7) and clearly uses the specificities i noticed in boxes 3 and 7.

I stopped the search for rank0 logic with four layers.

I'll see if my solver see something with five layers.

champagne

EDIT:
This is a pure rank 0 logic in a well known pattern.
No reason why my solver would not find it.
As it did not after I extended the search to 5 floors, I have something to fix.

EDIT 2:

Once found the reason why the solver did not find the rank 0 logic, it works, but is of no use in fact.

some remarks referring to ronk's SLG.

1) Ronk did not apply the 2 hidden pairs in boxes 1 and 9, doing part of the eliminations.
2) The Nice loop eliminates, if I am right, all the other eliminations shown in that rank 0 logic.
3) so the rank 0 logic exists but should be dry.
4) the 1;3;5;6;9 logic has additionnal potential

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by ronk » Wed Sep 22, 2010 11:58 pm

> **champagne wrote:**
> 2) The Nice loop eliminates, if I am right, all the other eliminations shown in that rank 0 logic.
> 3) so the rank 0 logic exists but should be dry.

This is the 2nd time you've mentioned a nice loop, as if there's only one. Would you please identify it? I've never seen a nice loop with 14+ exclusions that wasn't rank 0, so your software is probably finding the A*LS complement to the A*HS "SK-loop" that I posted.

ronk
2012 Supporter
Posts: 4764
Joined: 02 November 2005
Location: Southeastern USA

Re: The hardest sudokus (new thread)

by champagne » Thu Sep 23, 2010 6:40 am

> **ronk wrote:**
> This is the 2nd time you've mentioned a nice loop, as if there's only one. Would you please identify it? I've never seen a nice loop with 14+ exclusions that wasn't rank 0, so your software is probably finding the A*LS complement to the A*HS "SK-loop" that I posted.

here is the start of the solver

CODE: SELECT ALL
```
100000009040002080006000300000403070000060000020508000009000100080700040500000006
11.3/11.3/3.4 1 gsf
```

after eliminations from hidden pairs in boxes 1 (28) and 9 (78) we are there

CODE: SELECT ALL
```
||1     357   28     |368   34578  4567  |24567 256   9
||379   4     357    |1369  13579  2     |567   8     157
||28    579   6      |189   145789 14579 |3     125   12457
-------------------------------------------------------------
||689   1569  158    |4     129    3     |25689 7     1258
||34789 13579 134578 |129   6      179   |24589 12359 123458
||34679 2     1347   |5     179    8     |469   1369  134
-------------------------------------------------------------
||23467 367   9      |2368  23458  456   |1     235   78
||236   8     123    |7     12359  1569  |259   4     235
||5     137   12347  |12389 123489 149   |78    239   6
```

my solver writes the nice loop in that way

2r8c13 - 2r8c79 = 2r79c8 - 2r13c8 = AC:r1c7r3c9 (2r1c7r3c9 - 7r1c7r3c9) = 7r2c79 - 7r2c13 = 7r13c2 - 7r79c2 = AC:r7c1r9c3 (7r7c1r9c3 - 2r7c1r9c3)

clearing **6r1c7 7r2c5 1r3c9 7r5c2 2r5c8 6r7c1 2r8c5 1r9c3s 5r1c7r3c9 3r7c1r9c3** (12 eliminations)

if we use ALS instead of AHS/AC we have a shorter AIC (I change the start point for optical reasons)

2r79c8 - 2r13c8 |AHS:r2c7c9r13c8| 7r2c79 - 7r2c13 = 7r13c2 - 7r79c2 |AHS:r8c1c3r79c2| 2r8c13 - 2r8c79

it seems to me that we are at the same point.

champagne

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by eleven » Thu Sep 23, 2010 9:42 am

This is the SK loop i can see (using r13c2=37 -> r2c13=59 -> r2c79<>5):

CODE: SELECT ALL
```
r13c2=37 -> r79c2=16 -> r8c13=23 -> r8c79=59 -> r79c8=23 -> r13c8=15|56 -> r2c79=67|17 -> r2c13=59 -> r13c2=37
```

So i wonder, why you dont have the eliminations r5c2<>3 and r8c5<>3

eleven
Posts: 2820
Joined: 10 February 2008

Re: The hardest sudokus (new thread)

by champagne » Thu Sep 23, 2010 10:39 am

> **eleven wrote:**
> This is the SK loop i can see (using r13c2=37 -> r2c13=59 -> r2c79<>5):
> CODE: SELECT ALL
> ```
> r13c2=37 -> r79c2=16 -> r8c13=23 -> r8c79=59 -> r79c8=23 -> r13c8=15|56 -> r2c79=67|17 -> r2c13=59 -> r13c2=37
> ```
> So i wonder, why you dont have the eliminations r5c2<>3 and r8c5<>3

I have some difficulties with r2c79=67|17 -> r2c13=59 whatever is the PM I use.

champagne

PS: more

on top of it, I am not sure we can in that construction use the reverse property r13c2 -> r2c79<>5

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by eleven » Thu Sep 23, 2010 11:05 am

> **champagne wrote:**
>> **eleven wrote:**
>> on top of it, I am not sure we can in that construction use the reverse property r13c2 -> r2c79<>5

Of course i can, the loop is correct (for the assumption r13c2=37). But i see the problem with the reverse loop:

It also leaves 17 and 67 open for r79c2:
r13c2=59 -> r2c13=37 -> r2c79=15|16|56 -> r13c8=26|25|12 -> r79c8=35|59|39 -> r8c79=29|25 -> r8c13=13|16|36 -> r79c2=67|37|17 -> r13c2=59

So we only have a 7 common in r1379c2 in all possible cases (the last one being the possibilities, if the first 2 are false):
(r13c2=37 & r79c2=16) | (r13c2=59 & r79c2=67|37|17) | (r13c2=57|79 & r79c2=13|36) [corrected r13c2 to r13c2=57|79 in the last case]

Last edited by eleven on Thu Sep 23, 2010 1:53 pm, edited 1 time in total.

eleven
Posts: 2820
Joined: 10 February 2008

Re: The hardest sudokus (new thread)

by champagne » Thu Sep 23, 2010 12:19 pm

> **eleven wrote:**
>> **champagne wrote:**
>>> **eleven wrote:**
>>> on top of it, I am not sure we can in that construction use the reverse property r13c2 -> r2c79<>5
>
> Of course i can, the loop is correct (for the assumption r13c2=37). But i see the problem with the reverse loop:

no doubt you can use it in AIC's net.
my concern is when you use it to loop in a virus chain to conclude to a "double nice loop" similar to a SK loop.

When you close a nice loop, you always loop the AIC thru a strong link. For me, it is the same in a virus chain. You have to loop thru a "virus mode" link.

But your attempt to jump over one of the corner breaking the virus chain is very interesting.

champagne

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by champagne » Thu Sep 23, 2010 1:55 pm

Next step in gsf's puzzle should be another rank0 logic

floors 169
sets: rows 2;4;6;8
if I am right, again 12 eliminations

19r2c5 19r9c5 9r5c1 1r5c3 9r5c7 1r5c9 3r2c4 5r4c2 3r6c8 5r8c6

champagne

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany

Re: The hardest sudokus (new thread)

by eleven » Thu Sep 23, 2010 1:58 pm

I am not familiar with virus chains. But a loop A -> B -> .... -> A is a loop , either all is true or all is wrong.

So i can find the SK eliminations this way.
Loop 1: r13c2=37 -> r79c2=16 -> r8c13=23 -> r8c79=59 -> r79c8=23 -> **r13c8**=15|56 -> **r2c79**=67|17 -> r2c13=59 -> r13c2=37
Loop 2: r13c2=59 -> r2c13=37 -> **r2c79**=15|16|56 -> **r13c8**=26|25|12 -> r79c8=35|59|39 -> r8c79=29|25 -> r8c13=13|16|36 -> r79c2=67|37|17 -> r13c2=59

E.g. when you look at box 3, cells r2c79 and r13c8, they only can be:

Loop 1: 17-56, 67-15
Loop 2: 15-26, 16-25, 56-12
If both are wrong, we are left with 57-16 as the only remaing possibiltity.

In all cases you have 1, 5 and 6 in the 4 cells, so you can eliminate them from the rest of the box.

eleven
Posts: 2820
Joined: 10 February 2008

Re: The hardest sudokus (new thread)

by champagne » Thu Sep 23, 2010 3:13 pm

> **eleven wrote:**
> So i wonder, why you dont have the eliminations r5c2<>3 and r8c5<>3

sorry eleven, I am somehow lost.
I reacted to the eliminations 3r5c2 and 3r8c5.

After the simple nice loop described above, the PM is

CODE: SELECT ALL
```
||1     357  28     |368   34578  4567  |247   256  9
||379   4    357    |1369  1359   2     |567   8    157
||28    579  6      |189   145789 14579 |3     125  247
-------------------------------------------------------------
||689   1569 158    |4     129    3     |25689 7    1258
||34789 1359 134578 |129   6      179   |24589 1359 123458
||34679 2    1347   |5     179    8     |469   1369 134
-------------------------------------------------------------
||247   367  9      |2368  23458  456   |1     235  78
||236   8    123    |7     1359   1569  |259   4    235
||5     137  247    |12389 123489 149   |78    239  6
```

so the findings of your last post are already there.

champagne

ps: by the way, the 2 eliminations you are looking for are part of the clearings in my last rank 0 SLG

champagne
2017 Supporter
Posts: 7269
Joined: 02 August 2007
Location: France Brittany