Rating rules / Puzzles. Ordering the rules

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Author | **Message**

logel

Joined: 04 Aug 2009
Posts: 6
Location: Germany

Posted: Thu Oct 15, 2009 9:38 am Post subject: Re: Rating rules / Puzzles. Ordering the rules

eleven wrote:

> Now you have listed many of the rating problems, but i dont understand, what you want. A simple rating algorithm, which will be worse than the othe

Sorry, i was raising too much issues at the same time.

To describe more precisely what is spinning around in my head, see some analysis of this example.
It has medium difficulty and should be solved by any serious solver.

Code:

```
000010002001000030040005600000006700300000005008400000007800040050000900200030000
```

I put this configuration into three solver getting three correct but different results.
Comparing the results and playing around with some tuning of steps I got a forth result.
This is not for blaming a solver being good or bad, but pointing to a question.

(1) SudoRules by Denis Berthier:

Code:

```
- 3 x swordfish ( numbers 3, 4, 5 )
- 14 x nrc-chains of length 3 or 4
- 1 x row-box claim
- 10 x nrc-chains of length 3 or 4
- rest only singles
```

(2) X-Sudo by Alan Barker

Code:

```
- 3 x swordfish ( numbers 3, 4, 5 )
- 3 x T3 Discontinuous nice loop ( identical to first three nrc-chains in (1) only different name )
- 1 x T4 nice loop
- 1 x single
- 1 x T3 naked triple
- 2 x single
- 1 x T2 hidden pair
- 1 x T3 disc. nice loop
- rest singles
```

(3) Sudoku Explainer by Nikolas Juillerat

Code:

```
- 3 x swordfish ( numbers 3, 4, 5 )
- 3 x forcing Chain ( identical to (1) and (2), different explanation )
- 15 x forcing chain length 3 or 4
- 1 x claiming single
- 1 x hidden pair
- 2 x forcing chain length 3
- rest singles
```

All three solutions start with the same series of three swordfish patterns. OK, seems inevitable.
The next three moves are the same on all solutions, but have different rationale.
After that the pathes go into differnet directions, (2) and (3) meet later again at a hidden pair.

All solver seem to go for the nearest targets first. This means the minimum number of true nodes of the pattern or the chain length, which is mainly the same. I to have a similar concept of step simplicity. This is a straight forward strategy but does not take into account that steps may depend on previous ones. So many eliminations may have little value, because they would be cleaned up by singles later anyway.
So you could do better, see this manually derived solution:

(4) Tuned Solution

Code:

```
- 3 x swordfish ( numbers 3, 4, 5 )
- elimination of 8@R9C7 with a chain of lenght 4
- singles 1@R9C7 + 6@R9C9
```

```
- hidden pair 4+6@R2+8C5 ( same as in solution 2 or 3 )
- elimination of 6@R8C5 with a chain of length 4
- rest singles
```

When you manually solve sudoku, you often notice that many eliminations dont move the thing forward, until you find the critical points, where the structure bre
my friends regarded (4) simpler, smarted, faster, or whatever - without hesitating a second.

BUT this puts me into a dilemma. How to compare the solution pathes with a function (or <= relation) that is based on analytic parameters and not based on
guessing?
I did not find such a function, but without I cannot optimize the solution path. And rating sudoku is rating the solution pathes of a specific sudoku in the first pla
main point in this post. Second finding the optimal solution of this sudoku relative to the ordering function. Finally this implies the ordering or rating of all sudok

Without a clear and consistent order function of solution pathes I am fishing in the dark.
Hope you enjoy my arguments.

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denis_berthier

Posted: Thu Oct 15, 2009 10:36 am Post subject:

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

Logel,
I think you're misunderstanding the goals of this thread and therefore expecting too much of it.
The analyses done here are purely statistical. It entails that you can't conclude much of them when you try to apply them to a single puzzle.
No rating is perfect, we all know that.
Rating paths instead of the hardest rule would be nice, but nobody has proposed such a rating yet and I don't think it's an easy task. Moreover, finding the simp
according to this path rating would be (for the computer) exponentially more complex than finding a path with the shortest longer chains.

Your second point is unrelated to the first.
The only claim of SudoRules (and probably of some other solvers) is that the solution it finds is in the simplest solution space (i.e. has the smallest larger chain)
solution in L4, you may find manually an intuitively "simpler" one but you'll never find one that doesn't have a chain (or equivalent structure) of length 4 (unless
the definition of length). That's all.
You may consider it isn't much and you may propose a better solver.

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Pat

Posted: Thu Oct 15, 2009 10:51 am Post subject:

Joined: 18 Jul 2005
Posts: 1612

> **logel wrote:**
> rating sudoku is rating the solution path

even this simple statement may be disputed !

say the solution-path is just 2 duos
(i.e. the puzzle can be solved with just those 2)

- puzzle A has only **2** duos,
  and they're both needed
- puzzle B has **5** duos available,
  but only 2 of them are needed,
  the others as you said "don't move the thing forward"

puzzle B is tougher than A,
due to those red herrings

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Pat

Posted: Thu Oct 15, 2009 11:14 am Post subject: ISS (Infra-Sub-Superior) #11

Joined: 18 Jul 2005
Posts: 1612

> **logel wrote:**
> rating sudoku is rating the solution path

hey **logel**,

are you prepared to find (manually or with software, suit yourself)
the simplest solution-path
for this sample puzzle --

#11

> **Deano (2007.Apr.20) wrote:**
>
> 21 clues
>
> **Code:**

```
. . . | 6 . 9 | . . .
. . 1 | . . . | 7 . .
. 2 . | . . . | . 9 .
------+-------+------
8 . . | . 5 . | . . 7
7 . . | . 4 . | . . 6
4 . . | . 2 . | . . 8
------+-------+------
. 3 . | . . . | . 2 .
```

```
. . 5 | . . . | 3 . .
. . . | 4 . 8 | . . .
```

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logel

Posted: Mon Oct 19, 2009 10:56 am Post subject:

Joined: 04 Aug 2009
Posts: 6
Location: Germany

denis_berthier wrote:

> **Logel**,
> I think you're misunderstanding the goals of this thread and therefore expecting too much of it.
> The analyses done here are purely statistical. It entails that you can't conclude much of them when you try to apply them to a single puzzle.
> No rating is perfect, we all know that.
> Rating paths instead of the hardest rule would be nice, but nobody has proposed such a rating yet and I don't think it's an easy task. Moreover, findin
> simplest path according to this path rating would be (for the computer) exponentially more complex than finding a path with the shortest longer chain

Hi Denis
I completely understood the goal of this thread, but I simply was asking for more. I appreciate also all the work that has been done already, but there is no rea
thet point.
Your answer and my other research show that there is not even a good idea on the market to compare solution pathes. I would be happy to present an idea but
anything that is worth discussing.
I still feel unsatisfied if we can only compare sudoku solutions by coarse grain categories.

Pat wrote:

> **logel wrote:**
> rating sudoku is rating the solution path
>
> even this simple statement may be disputed !
>
> say the solution-path is just 2 duos
> (i.e. the puzzle can be solved with just those 2)
>
> - puzzle A has only **2** duos,
> and they're both needed
>
> - puzzle B has **5** duos available,
> but only 2 of them are needed,
> the others as you said "don't move the thing forward"
>
> puzzle B is tougher than A,
> due to those red herrings

Hi Pat
Maybe I was not clear enough, but your example shows exactly what I am pointing to. The crucial question is: WHY is B "tougher" than A? A precise definition i
works for all solution pathes. I dont have any such definition. So we can only "feel" that one solution is simpler than another.
Your example seem to be a poisoned egg.

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denis_berthier

Posted: Tue Oct 20, 2009 8:03 am Post subject:

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

HOW THE SER REALLY DEPENDS ON THE NUMBER OF CLUES
(Also posted in the "real distribution of minimal puzzles" thread, because this is where the two threads meet again.)

In a previous post:
http://www.sudoku.com/boards/viewtopic.php?t=14615&postdays=0&postorder=asc&start=554,
I gave an estimate of the real number-of-clues distribution of mininal puzzles.
It was based on a sample of 1,380,962 minimal puzzles, generated with the controlled-bias generator, taking as input 65 full scans of gsf's collection of all the (
classes of) complete grids.

I also gave a first, rough estimated value for the real SER (mean and standard deviation), in which the mean value and standard deviation for each fixed numbe
taken from those computed for the Sudogen0_1M collection.

Now, I have finished computing the SER for all the above 1,380,962 puzzles and I thus have much better estimates for each number of clues and for the global
Remember that, for any fixed number of clues, the controlled-bias generator, when it uses an integer number of full scans of gsf's collection, is completely unbia
each row of the the table below gives both the controlled-bias and the real values for the n-clue SER. Only the global mean values and standard deviations hav
differently (without or with the correction coefficients).

Code:

```
#clues  #instances       mean(SER)       standard-deviation(SER)
19      0
20      0
21      41               3.56 (*)        2.01 (*)
22      1,526            3.15            2.16
23      25,884           3.35            2.24
24      163,694          3.61            2.36
25      422,451          3.96            2.47
26      467,047          4.40            2.54
27      234,963          4.93            2.53
28      57,615           5.47            2.44
```

```
29      7,243           6.07            2.19
30      481             6.76            1.71
31      16              5.79 (*)        2.34 (*)
32      1               7.3 (*)         (*)
all    1,380,962

(*) values based on small samples are not meaningful.
```

Which gives:

Code:

```
controlled-bias mean(SER) = 4.29    controlled-bias standard-deviation(SER) = 2.48
real mean(SER) = 4.73               real standard-deviation(SER) = 2.49
(These figures are the same when suexg-cb is used as the source of complete grids)

correlation coefficient #clues vs SER = 0.19
```

What's most noticeable, when we compare with the results obtained for the various generators (bottom-up, top-down, full bottom-up), is **a stronger upward trend wrt the number of clues**.
In the [22, 29] range where they can be compared (enough instances in the samples), the mean starts from smaller SER (3.15 for 22 clues vs 3.27 for top-down higher SER (6.07 for 29 clues vs 5.43 for top-down). But the trend in the above results can be seen beyond that interval. It may also be opportune to recall that know a large proportion of the 17-clue minimals, for which the mean SER is 2.55.

The correlation coefficient #clues vs SER (= 0.19) is a little higher than for the top-down generator (0.12) but it remains too small to allow any complexity given the number of clues.

If needed, this confirms, once more and much more strongly than before, what I've said many times:
- the statistics for the (SER or NRCZT) complexity of puzzles depends strongly on the way these puzzles are built;
- in particular, building collections of puzzles that are unbiased wrt to the number of clues is no guarantee that they are unbiased wrt (SER or N complexity.

COMPLEMENTS
When suexg-cb is used as the source of complete grids (instead of gsf's collection, as above), I had forgotten to publish the following results.

The SER mean and standard deviations (based on 350,000 puzzles) are the same as for the gsf source.

The correlation coefficients are:
#clues vs SER = 0.20
#clues vs NRCZT = 0.19
SER vs NRCZT = 0.90

For the NRCZT (based on 250,000 puzzles):

Code:

```
controlled-bias average = 2.22                real (estimated) average = 2.45
controlled-bias standard-deviation = 1.35     real (estimated) standard-deviation = 1.39
```

As a result, there's no reason to suppose that anything will be changed for these NRCZT values when gsf is used as the source of complete grids and I don't pla to make additional NRCZT computations for this case.

Last edited by denis_berthier on Wed Oct 21, 2009 5:49 am; edited 1 time in total

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Red Ed

Posted: Tue Oct 20, 2009 4:10 pm Post subject:

Joined: 06 Jun 2005
Posts: 940

To help you draw out the trend further, I'll get around to computing the mean SER for my 700+ 32s at some point (EDIT: done - it's 6.84 over 711 puzzles). I'm you've not already included **eleven**'s result, i.e. mean 6.88 over 369 clustered puzzles.

It would be good to see the same results for NRCZT. With that in mind, can I draw your attention to my recent "algorithm" thread?

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logel

Posted: Tue Oct 20, 2009 8:22 pm Post subject: Re: ISS (Infra-Sub-Superior) #11

Joined: 04 Aug 2009
Posts: 6
Location: Germany

Pat wrote:

hey **logel**,

are you prepared to find (manually or with software, suit yourself)
the simplest solution-path
for this sample puzzle --

#11

Deano (2007.Apr.20) wrote:

21 clues

Code:

```
. . . | 6 . 9 | . . .
. . 1 | . . . | 7 . .
. 2 . | . . . | . 9 .
------+-------+------
8 . . | . 5 . | . . 7
7 . . | . 4 . | . . 6
4 . . | . 2 . | . . 8
------+-------+------
. 3 . | . . . | . 2 .
. . 5 | . . . | 3 . .
. . . | 4 . 8 | . . .
```

I am not quite sure about the intention of your question, but analysis of this example has an interesting result. Its easy to solve, just with a sequence of row/co intersections (claiming/pointing). The partial elimination pathes of numbers 1,2,3,5,6,9 are independent from each other through the first steps, so there is no s moves. After 16 steps the pattern is solved. I dont count the singles, because with 21 clues you need 60 singles sooner or later.

The "best" solution I found is: (singles in between the steps not shown)
First apply a hidden pair n4+n8 of box 7.
Then elininate 2@r8c1, 7@r9c8, 3@r1c3, 6@r9c3 in any order with row/col-box intersections. Beyond that point there are only singles.
I think its "simpler" without having a waterproof definition of simple.

My point is that strictly using the simplest method does not always lead to the simplest solution. (I rate Hidden Pair to be more complex than Line-Box)
Now its your turn to trade 12 line-box units against one hidden pair unit.

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Pat

Joined: 18 Jul 2005
Posts: 1612

Posted: Wed Oct 21, 2009 3:28 pm Post subject: re: ISS (Infra-Sub-Superior) #11

> **logel wrote:**
>
> I am not quite sure about the intention of your question, but analysis of this example has an interesting result. Its easy to solve, just with a sequence row/col-box intersections (claiming/pointing). The partial elimination pathes of numbers 1,2,3,5,6,9 are independent from each other through the first so there is no strict order of that moves. After 16 steps the pattern is solved. I dont count the singles, because with 21 clues you need 60 singles soon later.
>
> The "best" solution I found is: (singles in between the steps not shown)
> First apply a hidden pair n4+n8 of box 7.
> Then elininate 2@r8c1, 7@r9c8, 3@r1c3, 6@r9c3 in any order with row/col-box intersections. Beyond that point there are only singles.
> I think its "simpler" without having a waterproof definition of simple.
>
> My point is that strictly using the simplest method does not always lead to the simplest solution. (I rate Hidden Pair to be more complex than Line-Bo
> Now its your turn to trade 12 line-box units against one hidden pair unit.

thanks, **logel**

1 "hidden" duo + **4** box-line interactions --
that's a nice solution-path.

> "strictly using the simplest method
> does not always lead to the simplest solution-path" --
> okay,
> but then we really have no way to define the simplest path.

back in 2007, i enjoyed solving **Deano**'s puzzle

> i mean, just solving it,
> without determining the simplest path

i had solved it with a total of **15** line-to-box exclusions

> (deliberately avoiding the "hidden" duo,
> which i too rate above box-line interactions)
>
> if we do try using only box-line interactions,
> **daj95376 (2007.Jun) wrote:**
> What an interesting search tree puzzle #11 must create

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denis_berthier

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

Posted: Wed Nov 11, 2009 11:38 am Post subject: quote edit

THE REAL (NRCZT-) COMPLEXITY DISTRIBUTION OF MINIMAL PUZZLES

Now that the controlled-bias generator has produced 5,926,343 minimal puzzles, I can give statistics for the real (nrczt) complexity distribution of minimal puzz lately become my ultimate goal in this thread.
These results rely on those presented in the "real distribution of minimal puzzles" thread: http://www.sudoku.com/boards/viewtopic.php?t=14615&start=632.

It is also interesting to compare it with the complexity distribution of minimal puzzles produced by different types of generators.

Code:

```
                L1_0     L1       L2       L3       L4       L5       L6       L7       L8       L9       L10      L11      L12
bottom-up       46.27    13.32    12.36    15.17    10.18    1.98     0.49     0.19     0.020    0.010    0 *      0.01 *   0 *
top-down        41.76    12.06    13.84    16.86    12.29    2.42     0.55     0.15     0.047    0.013    3.8e-3   1.5e-3   9.0e-4
controlled-bias 35.08    9.82     13.05    20.03    17.37    3.56     0.79     0.21     0.055    0.015    4.4e-3   1.2e-3   3.2e-4
real            29.17    8.44     12.61    22.26    21.39    4.67     1.07     0.29     0.072    0.020    5.5e-3   1.5e-3   3.4e-4
_____________________________________________________________________________________________________________________________
* values based on a small sub-sample are not reliable.
```

These distributions show very clearly the complexity bias of the three kinds of generators.
All these distributions have the same two modes, at L1_0 and at L3, as the real distribution.
It can be seen that when we move from bottom-up to top-down to controlled-bias to real, the mass of the distribution moves progressively to the right.
This displacement towards higher complexity occurs mainly at the first nrczt-levels, after which it is only very slight.

In any cases:
- more than 98.5% of the puzzles can be solved with whips of maximal length 5;
- more than 99% of the puzzles can be solved with whips of maximal length 7;
- more than 99.9% of the puzzles can be solved with whips of maximal length 9;
- all the puzzles can be solved with whips.

A better presentation with html tables is available on my website.

The idea that the current generators (bottom-up or top-down) could be biased wrt to the number of clues (AFAICT, first mentioned by Coloin, Red Ed,...) led me
(that I wanted short, but that lasted more than expected) into the domain of puzzle generation. This led me to define the controlled-bias generator (in the "real
thread: http://www.sudoku.com/boards/viewtopic.php?t=14615&start=134) and to generate a large sample of puzzles with it. This also led to an unprecedente
produce a first version of the controlled-bias generator and then faster versions, with main contributions by **eleven** and **Paul Isaacson**. Without their optimisa
have been very difficult to generate so large collections. Another major contribution to the optimisation was **gsf**'s compressed list of all the (isomorphism classe
grids and his fast decompressor.

In a sense, after all the long computations involved in the above results, I have now reached my ultimate goal wrt classification and it is therefore likely that I w
to say on this topic for a while.

Last edited by denis_berthier on Sat Nov 14, 2009 6:40 pm; edited 2 times in total

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denis_berthier

Posted: Sat Nov 14, 2009 3:19 pm Post subject:

[deleted: copy, instead of edit, of the previous post]

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

Last edited by denis_berthier on Sat Nov 14, 2009 6:41 pm; edited 1 time in total

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Red Ed

Posted: Sat Nov 14, 2009 3:50 pm Post subject:

Joined: 06 Jun 2005
Posts: 940

> **denis_berthier wrote:**
> In any cases:
> - more than 98.5% of the puzzles can be solved with whips of maximal length 5;
> - more than 99% of the puzzles can be solved with whips of maximal length 7;
> - more than 99.9% of the puzzles can be solved with whips of maximal length 9;
> - all the puzzles can be solved with whips.

There's been some confusion over this elsewhere (can't remember which thread exactly). Do you mean that all of your 5926343 minimal puzzles can be solved
whips), or by a "resolution theory" that besides whips also includes subsets+fish?

btw, any big announcements planned for post #1000 ?

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denis_berthier

Posted: Sat Nov 14, 2009 6:43 pm Post subject:

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

> **Red Ed wrote:**
> > **denis_berthier wrote:**
> > In any cases:
> > - more than 98.5% of the puzzles can be solved with whips of maximal length 5;
> > - more than 99% of the puzzles can be solved with whips of maximal length 7;
> > - more than 99.9% of the puzzles can be solved with whips of maximal length 9;
> > - all the puzzles can be solved with whips.
>
> There's been some confusion over this elsewhere (can't remember which thread exactly). Do you mean that all of your 5926343 minimal puzzles can b
> solved by whips (just whips), or by a "resolution theory" that besides whips also includes subsets+fish?

All these results are true in both cases.

> **Red Ed wrote:**

> btw, any big announcements planned for post #1000 ?

I was expecting someone would send chocolate or champagne.

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denis_berthier

Posted: Sat Nov 21, 2009 10:53 am Post subject:

Joined: 19 Jun 2007
Posts: 1001
Location: Paris, France

Comparison of my main 4 ratings: NRCZT, pNRCZT, B-NRCZT and pB-NRCZT

First of all, it should be recalled that a rating is meaningful only statistically, as I already stated in the first post of this thread. Unfrequent differences between t different ratings (or their implementations) are therefore not really meaningful.

1) Recalling the definitions

1.1) The NRCZT rating
The first rating I introduced is the NRCZT rating. It is based on the following sets of rules:

NRCZT0: elementary constraints propagation (no puzzle can be solved here)
NRCZT1_0: Naked and Hidden Singles,
NRCZT1: elementary interactions between rows/columns and blocks (equivalent to nrczt-whips[1])
NRCZT2: Naked, Hidden and Super-Hidden Pairs + nrczt-whips[2]
NRCZT3: Naked, Hidden and Super-Hidden Triplets + nrczt-whips[3]
NRCZT4: Naked, Hidden and Super-Hidden Quads + nrczt-whips[4]
NRCZT5: nrczt-whips[5]
For n>4: NRCZTn: nrczt-whips[n]

For any n, T(NRCZT(n)) is the first order logical theory consisting of the rules in sets NRCZT0 to NRCZTn.
The T(NRCZT(n)), n≥0, form a sequence of logical theories of increasing strength.
The NRCZT rating of a puzzle P is defined to be the smallest n such that P can be solved in T(NRCZT(n)).
The definition of the NRCZT rating is thus purely logical, intrinsic, independent of any implementation of the nrczt-whips.

(Notice that one can also define the NRCZT rating of a puzzle with no solution: it is the smallest n such that P can be proven to be contradictory in T(NRCZT(n))

1.2) The p-NRCZT rating
It is defined by merely forgetting everywhere the Subset rules in the definition of the NRCZT rating.
pNRCZTn0 = NRCZT0
pNRCZT1_0 = NRCZT1_0
pNRCZTn = nrczt-whips(n), for all n ≥ 1

1.3) The B-NRCZT rating is defined by replacing everywhere whips by braids in the definition of the NRCZT rating.

1.4) The pB-NRCZT rating is defined by replacing everywhere whips by braids in the definition of the pNRCZT rating.

2) Properties common to all these ratings
1) All these ratings have purely logical, intrinsic definitions - independent of any implementation.
2) All these ratings are invariant under any of the logical symmetries of Sudoku (contrary to SER).
3) For all these ratings, there is a strong correlation between the rating and the log of the number of partial chains necessary to solve the puzzle: they define a of complexity.
4) All these ratings are well correlated with the SER, although they are based on very different rules.
5) All these ratings are first of all ratings of rules, which are extended to ratings of puzzles in the SER style.
6) The insertion of the subset rules in the pure NRCZT or B-NRCZT hierarchies is justified by both the exact and the statistical subsumption theorems (http://www.carva.org/denis.berthier/HLS/Subsumption.html).

3) Properties specific to braids
The scope of braids can be defined in a very simple way thanks to the braids vs T&E theorem (see the abominable T&E thread: http://www.sudoku.com/boards/ t=6390).
All the pB-NRCZT(n) and all the B-NRCZT(n) theories have the confluence property (proof here: http://www.carva.org/denis.berthier/HLS/CISSE08-CSP-P2.pdf) use various strategies in the search for braids.
In a sense, these properties make braids more interesting than whips from a theoretical point of view.
But whips are more interesting from a practical point of view.
Anyway, adopting one or the other is not really relevant, as can be understood from the results stated in following sections.

3) Strict (obvious) inequalities between these ratings
NRCZT ≤ pNRCZT
B-NRCZT ≤ pB-NRCZT
B-NRCZT ≤ NRCZT
pB-NRCZT ≤ pNRCZT

which can also be written as:
B-NRCZT ≤ pB-NRCZT, NRCZT ≤ pNRCZT

4) Statistical almost equalities between these ratings
NRCZT = pNRCZT in more than 99.9% of the cases
pB-NRCZT = pNRCZT in 99.7 % of the cases
The explanation for the proximity of NRCZT and pNRCZT or of B-NRCZT and pB-NRCZT is that almost all Subsets are subsumed by whips - see my subsumption
http://www.carva.org/denis.berthier/HLS/Subsumption.html)

5) Consequence on statistics
All the statistics given in my previous posts remain true for any of these 4 ratings.

6) Other practical consequences
- As whips are special types of braids, having shown that all the puzzles generated by random generators (in samples of total size ~ 10,000,000) can be solved
stronger than having shown that they can be solved by braids.
- Allowing inner loops in whips (which is not allowed in the standard definition), although it would introduce much more complexity, is unlikely to bring any inter
this is weaker than adopting braids.
- Ratings based on braids (pB-NRCZT or B-NRCZT) are more difficult to compute than ratings based on whips (pNRCZT or NRCZT). Indeed, the only current imp
braids is SudoRules and it is much slower for braids than for whips. **Paul**, we all rely on you for a faster implementation of braids
- Ratings based on whips are a good approximation of ratings based on braids (and conversely).

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Red Ed

Joined: 06 Jun 2005
Posts: 940

Posted: Sat Nov 21, 2009 11:50 am Post subject:

denis_berthier wrote:

> - Ratings based on braids (pB-NRCZT or B-NRCZT) are more difficult to compute than ratings based on whips (pNRCZT or NRCZT). Indeed, the only c
> implementation of braids is SudoRules and it is much slower for braids than for whips. **Paul**, we all rely on you for a faster implementation of braids

My unverified NRCZT-braids code (note - SudoRules *isn't* the only implementation) is about 50% slower than my NRCZT-whips code on the royle17_100_v.txt t
looks likely that I'll agree with your assessment that braid ratings are more difficult to compute than whip ratings, at least with my algorithm.

AFAIK, at the time of writing, my NRCZT-whips code is the quickest verified implementation for recovering longish whips (length ~10), though I expect **Allan** to
eclipse that when he's ironed out some bugs. Paul's been a huge help in giving us test data to check against, and has a very fast NRCZT-based solver, but when
program was relatively slow on long whips. I dispute that "we all rely on" Paul for a faster implementation of NRCZT-braids.

It would be good to get some pB-NRCZT ratings to verify our (Paul's, Allan's, mine) programs against. Do you have any online?

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