Fully supersymmetric chains

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newtopic postreply **Sudoku Players' Forums Forum Index -> Advanced solving techniques**

Author

denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Wed Nov 25, 2009 7:03 am Post subject:

Aran
The complexity question should always be considered with precise constraints. In the present case: do you want any solution or a solution with the shortest cha

Example of this dependency on constraints:

T&E (as I have defined it precisely, with no guessing: http://www.sudoku.com/boards/viewtopic.php?t=6390) is a very simple procedure. Anyone can program

I've proven that any solution based on this T&E can be obtained with nrczt-braids. Now, if you want a solution with braids of minimal lengths, that's a much har
- the SudoRules implementation is very slow (sure, I have had little time to optimise it, but even if some day I find other optimisations it will remain much slow
- AFAIK, none of the recent other tentative implementations of braids is working.

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denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Wed Nov 25, 2009 7:18 am Post subject:

> **Allan Barker wrote:**
> Somewhere between the nrctz chains and using full complexity, there must be a *mighty fine solver*

Considering my classification results (http://www.sudoku.com/boards/viewtopic.php?t=5995&postdays=0&postorder=asc&start=429), nrczt-whips are already a
But there remain exceptional puzzles they can't solve and I understand that some extensions can be looked for.
I have introduced such extensions: zt-whips(FP) or zt-braids(FP), where FP is some family of simple patterns (http://www.sudoku.com/boards/viewtopic.php?t=
Applied to the hardest known puzzles (gsf's collection), I've shown (http://www.sudoku.com/boards/viewtopic.php?t=6390&postdays=0&postorder=asc&start=4
I haven't had time to try adding a few elementary patterns to this FP family, but I think this is enough to show that we needn't excessively complex extensions

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Allan Barker

Joined: 21 Feb 2008
Posts: 441
Location: Bangkok

Posted: Wed Nov 25, 2009 5:56 pm Post subject:

> **Denis Berthier wrote:**
> Considering my classification results (http://www.sudoku.com/boards/viewtopic.php?t=5995&postdays=0&postorder=asc&start=429), nrczt-w

Hi **Denis**,

There was no intention to suggest that nrczt whips, or the entire framework does not make a mighty fine solver. I've always thought it does. I was referring to,

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denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Wed Nov 25, 2009 6:41 pm Post subject:

> **Allan Barker wrote:**
> There was no intention to suggest that nrczt whips, or the entire framework does not make a mighty fine solver. I've always thought it does. I
> available today.

Hi **Allan**,
I had understood. I just wanted to stress that the zt-ing principle offers still unexplored possibilities.

As for *faster*, in the current context, it must refer to the SudoRules implementation of braids. Yes, it would be good to have a faster implementation. Paul sugge
Indeed, I don't understand why it is so hard to implement braids once you have implemented whips - and this is valid for **Paul** also. I don't mean implementing
A braid is still a **sequence** of candidates. Sequentiality is essential. I've repeated this several times to Paul but he is still fighting with several branches. The onl
To give you an idea of it, it took me a few hours to transform (a copy of) whips into braids in SudoRules. I couldn't do much with it, because of memory overflo

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aran

Joined: 02 Mar 2007
Posts: 444

Posted: Thu Nov 26, 2009 12:19 am Post subject:

> **denis_berthier wrote:**
>
> A braid is still a **sequence** of candidates. Sequentiality is essential. I've repeated this several times to Paul but he is still fighting with several

Denis
With braids as you define them, it seemed to me that the following would be acceptable :

let Rk be the kth sequential right-hand link established in a braid which has not yet concluded.
Assume that as a next step, there are numerous possible nrc-links available (both from earlier R-links and from Rk).
Assume that in the cells in which reside the resulting L-links there remains more than one possibility for an R-link (ie more than one cell for which incoming nrc
Then arbitrary choice will determine the k+1th R-link in this sequence.
From your above comment however, I think you intend sequentiality to mean something stronger.
Could you clarify this for me ?

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denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Thu Nov 26, 2009 6:18 am Post subject:

Aran,
By sequentiality, I mean that a braid is first of all a SEQUENCE of candidates: L1 R1 L2 R2 L3 R3 ...
I mean no more but also no less.
In a sense, once an nrc discontinuity has been allowed to find some Lk (in general there are few discontinuities in the braids), it (i.e. the discontinuity) can be c
displayed as Rk - Lk+1 is known to be an nrc-link in a whip but may mean an nrc-link to Z or to some previous Rl in a braid. Which of Z or an Rl it is, this can e
Conversely, if the order of the sequence is lost, there's no way it can be reconstructed.

When you have built a partial braid[k] upto Rk and you're trying to build the next Lk+1 Rk+1, if you find some Lk+1 such that there exist several possible Rk+

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PIsaacson

Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

Posted: Fri Nov 27, 2009 12:45 pm Post subject:

Denis,

The difficulty (at least for me) with briads is not in the generation of them, but in the presentation of them and in obtaining an absolutely correct length calculati
braids while being limited to the operations available within C/C++. It must be nice to just write a logical rule and let the CLIPS interpreter do its thing...

For me, the simpliest approach was to take my standard BFS tree walk, and then modify the various exit points and zt promotion code to take advantage of an
various strands (as I call them) are generated in parallel and need to be re-assembled in order to display the correct braid structure/sequence.

Think of a tree stemming from a given z-target (assumed true) at level 0. All the asserted false nrc linked children of the z-target appear at level 1 from the BFS
become strong linked. At each even level in my braids code, children can be zt promoted from all the accumulated prior truths. This also means that all prior tru

This was a fairly simple change to apply to my nrczt generation algorithm, and it does indeed rapidly find braids which solve puzzles beyond the ability of stand
unique runs as well. In C/C++, it requires a fairly sophisticated algorithm to correct track all the dependencies, to correctly "weave" the strands to compute the

I believe I am at that point, or very nearly there. I'm still validating my tests against the sudogen0_1m collection, but preliminary indications are that braids pro

Cheers,
Paul

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denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Fri Nov 27, 2009 7:22 pm Post subject:

Hi **Paul**,

> **PIsaacson wrote:**
> The difficulty (at least for me) with briads is not in the generation of them, but in the presentation of them and in obtaining an absolutely corre

I think you meet such difficulties because your generation process is intrinsically flawed. As long as you'll think in terms of nets and of BFS, it will be flawed. Bra

> **PIsaacson wrote:**
> It must be nice to just write a logical rule and let the CLIPS interpreter do its thing...

It would be nice if it was so simple. But if I don't add some optimisations, I'm quickly caught in a big memory explosion.

> **PIsaacson wrote:**
> I'm still validating my tests against the sudogen0_1m collection, but preliminary indications are that braids produced a smaller score for at leas

Utterly unlikely. You should take the first such examples and check all their "braids".

> **PIsaacson wrote:**
> There are 464 cases in which braids scored higher than my nrczt chains/whips scores

Impossible, of course, for a correct implementation.

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denis_berthier

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Posted: Sun Nov 29, 2009 6:31 am Post subject:

Improved nrc notation

I have devised an improved version of (the strict version of) the nrc notation.
It allows a very uniform presentation of all the 2D or 3D chains/whips/braids.

And it stresses more than before the complementarity between the two possible views of chains: sequences of cells vs sequences of candidates.

As usual, each pattern is prefixed by its name and length.
Chains/whips/braids are still displayed as sequences A1 - A2 - A3 - …
where each Ai is a pair of bivalue/bilocal candidates (modulo z and/or t)

Each Ai is now written systematically in the form 2D-cell{Li Ri}, where:

- "2D-cell" is some explicitly named rc-, rn-, cn- or bn- cell; this cell is bivalue (or bivalue modulo the target and/or the previous right-linking candidates);

- {Li Ri} is the couple of values in the previous rc, rn, cn or bn cell; additional z or t candidates can be added in these cells, in an unchanged manner, with the #

- if 2D-space = bn, then the block now appears explicitly, but Li and Ri are still written in the "rc style": r1c1, r2c2… ; putting instead a coordinate internal to th
candidates;

- for whips or braids, the final inexistent a2 is still represented by a dot; as the final 2D-space, in which the contradiction occurs, appears at the end, it becomes

Notice that for 2D chains (xy, hxy,...), this new convention reverses the old order of each element, which was {Li Ri}2D-cell.

An example (the hardest puzzle in the controlled-bias suexg-cb collection of ~ 250,000 minimal puzzles) will illustrate this better than long comments.

Code:

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

Code:

```
_____________________________________________________________________________________________________________
*****  SudoRules version 13.7wter  *****
5......72..4.2.....8.1.56.......94....3....982...3.7...1.3..9...2691..5.....56...
singles ==> r3c3 = 2, r7c3 = 5
interaction row r1 with block b2 for number 4 ==> r3c5 <> 4
nrc-chain[2]  r4n2{c4 c8} - r7n2{c8 c6} ==> r9c4 <> 2
hidden-single-in-block b8 ==> r7c6 = 2
nrczt-whip[3]  r4n3{c8 c9} - r8n3{c9 c1} - r3n3{c1 .} ==> r9c8 <> 3
nrczt-whip[3]  c7n5{r2 r5} - b6n2{r5c7 r4c8} - c8n3{r4 .} ==> r2c7 <> 3
nrczt-whip[3]  c7n3{r8 r1} - r3n3{c9 c1} - b7n3{r9c1 .} ==> r9c9 <> 3
nrczt-whip[5]  r8c7{n8 n3} - r1c7{n3 n1} - r1c3{n1 n9} - r2n9{c2 c9} - r2n5{c9 .} ==> r2c7 <> 8
nrczt-whip[6]  r3n7{c1 c5} - c6n7{r2 r5} - c6n1{r5 r6} - r6c8{n1 n6} - r7n6{c8 c9} - r7n7{c9 .} ==> r8c1 <> 7
nrczt-whip[7]  r3n7{c1 c5} - r7n7{c5 c9} - r7n6{c9 c8} - r6c8{n6 n1} - r4n1{c9 c3} - r1c3{n1 n9} - c5n9{r1 .}
nrczt-whip[8]  r8c7{n8 n3} - r1c7{n3 n1} - r2n1{c9 c1} - r1c3{n1 n9} - c1n9{r3 r9} - c1n3{r9 r3} - r3n7{c1 c5
nrczt-whip[9]  c4n2{r4 r5} - b6n2{r5c7 r4c8} - r4n3{c8 c9} - r4n5{c9 c2} - c4n5{r4 r6} - c9n5{r6 r2} - c9n9{r
nrczt-whip[10]  b1n7{r3c1 r2c2} - c6n7{r2 r8} - c4n7{r9 r4} - r4n2{c4 c8} - r4n3{c8 c9} - r8c9{n3 n4} - r3c9{
nrczt-whip[11]  c4n2{r4 r5} - b6n2{r5c7 r4c8} - r4n3{c8 c9} - r4n5{c9 c2} - r5n5{c2 c7} - c9n5{r6 r2} - c9n9{
nrczt-whip[11]  b1n7{r3c1 r2c2} - b2n7{r2c6 r3c5} - b8n7{r7c5 r8c6} - r5n7{c6 c4} - r5n2{c4 c7} - r5n5{c7 c2}
nrczt-whip[12]  c3n7{r9 r4} - c2n7{r5 r2} - r3n7{c1 c5} - c4n7{r2 r5} - r5n2{c4 c7} - r5n5{c7 c2} - r4c2{n5 n
nrczt-whip[9]  r6c8{n6 n1} - c6n1{r6 r5} - r5c1{n1 n4} - b7n4{r9c1 r9c2} - r9c9{n4 n1} - r6c9{n1 n5} - c7n5{r
nrczt-whip[9]  c6n1{r5 r6} - r6c8{n1 n6} - r7n6{c8 c9} - c9n7{r7 r8} - r8c6{n7 n8} - c7n8{r8 r1} - c5n8{r1 r4
nrczt-whip[11]  r3c8{n3 n4} - r3c9{n4 n9} - r3c5{n9 n7} - r2c6{n7 n8} - r2c8{n8 n1} - r6c8{n1 n6} - r7n6{c8 c
nrczt-whip[11]  r6c8{n6 n1} - r6c9{n1 n5} - r6n6{c9 c4} - c5n6{r5 r1} - c5n9{r1 r3} - c9n9{r3 r2} - r2n5{c9 c
nrczt-whip[11]  r6c8{n6 n1} - r6c9{n1 n5} - b6n6{r6c9 r4c8} - c5n6{r4 r1} - c5n9{r1 r3} - c9n9{r3 r2} - r2n5{
interaction row r6 with block b6 for number 6 ==> r4c8 <> 6
[b]nrczt-whip[13]  c9n9{r2 r3} - r3c5{n9 n7} - b1n7{r3c1 r2c2} - b1n6{r2c2 r1c2} - r4c2{n6 n5} - r5c2{n5 n4}
nrct-chain[12]  r2n9{c9 c2} - r6n9{c2 c3} - r1n9{c3 c5} - r3c5{n9 n7} - r2n7{c4 c1} - r3c1{n7 n3} - c2n3{r1 r
nrczt-whip[5]  b3n8{r1c7 r2c8} - c8n3{r2 r4} - b6n2{r4c8 r5c7} - c7n5{r5 r2} - b3n1{r2c7 .} ==> r1c7 <> 3
interaction column c7 with block b9 for number 3 ==> r8c9 <> 3
nrczt-whip[8]  c1n9{r9 r3} - r1c3{n9 n1} - r1c7{n1 n8} - r8c7{n8 n3} - c1n3{r8 r2} - b1n7{r2c1 r2c2} - r2c6{n
nrct-chain[9]  r9c9{n1 n4} - r8c9{n4 n7} - r7c9{n7 n6} - r7c8{n6 n8} - b3n8{r2c8 r1c7} - c5n8{r1 r4} - c1n8{r
nrc-chain[3]  c9n1{r9 r4} - r4n3{c9 c8} - c8n2{r4 r9} ==> r9c8 <> 1
nrczt-whip[10]  c7n8{r1 r8} - b8n8{r8c6 r7c5} - b7n8{r7c1 r9c3} - c3n7{r9 r4} - r4c5{n7 n6} - r1n6{c5 c2} - r
nrczt-whip[10]  c9n9{r2 r3} - r3n4{c9 c8} - r3n3{c8 c1} - c1n9{r3 r9} - b7n3{r9c1 r9c2} - r1c2{n3 n6} - r1c4{
singles ==> r2c9 = 9, r2c7 = 5
naked-pairs-in-a-block b3{r3c8 r3c9}{n3 n4} ==> r2c8 <> 3
interaction block b3 with row r3 for number 3 ==> r3c1 <> 3
nrc-chain[3]  r5c6{n7 n1} - r5c7{n1 n2} - c4n2{r5 r4} ==> r4c4 <> 7
nrc-chain[5]  r6c9{n5 n6} - r6c8{n6 n1} - r2n1{c8 c1} - r1c3{n1 n9} - b4n9{r6c3 r6c2} ==> r6c2 <> 5
nrczt-whip[5]  r3n7{c1 c5} - r7n7{c5 c9} - r7n6{c9 c8} - r6c8{n6 n1} - r2n1{c8 .} ==> r2c1 <> 7
nrczt-whip[6]  c3n7{r4 r9} - r7n7{c1 c9} - c9n6{r7 r6} - c9n5{r6 r4} - c2n5{r4 r5} - r5n7{c2 .} ==> r4c5 <> 7
interaction row r4 with block b4 for number 7 ==> r5c2 <> 7
nrczt-whip[6]  b3n8{r1c7 r2c8} - r7n8{c8 c1} - r4n8{c1 c3} - r4c5{n8 n6} - r4c1{n6 n1} - r2n1{c1 .} ==> r1c5
nrct-chain[4]  r1n8{c6 c7} - r2c8{n8 n1} - r1n1{c7 c3} - r6n1{c3 c6} ==> r6c6 <> 8
nrczt-whip[5]  c4n2{r5 r4} - c4n5{r4 r6} - r6n4{c4 c2} - r6n9{c2 c3} - r6n8{c3 .} ==> r5c4 <> 4
nrct-chain[6]  c6n3{r2 r1} - r1n8{c6 c7} - r1n1{c7 c3} - r2n1{c1 c8} - r6n1{c8 c6} - r5c6{n1 n7} ==> r2c6 <>
swordfish-in-rows n7{r2 r4 r9}{c4 c2 c3} ==> r5c4 <> 7
nrc-chain[5]  c9n6{r7 r6} - r6c8{n6 n1} - c6n1{r6 r5} - c6n7{r5 r8} - r8c9{n7 n4} ==> r7c9 <> 4
nrc-chain[5]  r6c8{n1 n6} - c9n6{r6 r7} - b9n7{r7c9 r8c9} - c6n7{r8 r5} - b5n1{r5c6 r6c6} ==> r6c3 <> 1
nrc-chain[2]  c3n1{r4 r1} - r2n1{c1 c8} ==> r4c8 <> 1
nrczt-whip[5]  c5n8{r4 r7} - r8n8{c6 c7} - r1c7{n8 n1} - r1c3{n1 n9} - r6c3{n9 .} ==> r4c1 <> 8
interaction column c1 with block b7 for number 8 ==> r9c3 <> 8
nrc-chain[3]  r9c3{n7 n9} - c1n9{r9 r3} - c1n7{r3 r7} ==> r9c2 <> 7
```

```
nrc-chain[3]  r9c3{n9 n7} - c1n7{r7 r3} - c1n9{r3 r9} ==> r9c2 <> 9
hxyt-cn-chain[4]  c4n7{r2 r9} - c3n7{r9 r4} - c3n8{r4 r6} - c4n8{r6 r2} ==> r2c4 <> 6
interaction row r2 with block b1 for number 6 ==> r1c2 <> 6
naked-triplets-in-a-column c2{r1 r6 r9}{n3 n9 n4} ==> r5c2 <> 4,  r2c2 <> 3
nrc-chain[3]  b4n4{r5c1 r6c2} - r6n9{c2 c3} - r9n9{c3 c1} ==> r9c1 <> 4
nrc-chain[4]  c2n4{r9 r6} - b4n9{r6c2 r6c3} - r6n8{c3 c4} - r9n8{c4 c8} ==> r9c8 <> 4
nrct-chain[4]  r2c4{n7 n8} - c6n8{r2 r8} - b7n8{r8c1 r7c1} - b7n7{r7c1 r9c3} ==> r9c4 <> 7
singles ==> r2c4 = 7, r3c5 = 9,  r3c1 = 7, r2c2 = 6,  r5c2 = 5, r4c2 = 7,  r9c3 = 7, r9c1 = 9
interaction block b2 with column c6 for number 8 ==> r8c6 <> 8
naked-pairs-in-a-row r8{c6 c9}{n4 n7} ==> r8c1 <> 4
naked-pairs-in-a-block b2{r1c4 r1c5}{n4 n6} ==> r1c6 <> 4
nrc-chain[2]  c6n4{r8 r6} - c2n4{r6 r9} ==> r9c4 <> 4
singles
GRID 0 SOLVED. LEVEL = NRCZT13, MOST COMPLEX RULE = NRCZT13
539468172
164723589
782195643
671289435
453671298
298534716
815342967
326917854
947856321
```

Remarks:
- this change (not yet implemented for braids in SudoRules) entails some additional load on time and memory; I may therefore use both this (slightly modified)
- for subset rules, the various defining elements are written in the natural quantification order;
- there is no change in the definition of the rules; this is only a matter of presentation.

[Edit 12/15/09 : corrected an error in the function displaying large whips]

Last edited by denis_berthier on Tue Dec 15, 2009 5:39 am; edited 1 time in total

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denis_berthier

Posted: Mon Nov 30, 2009 7:36 am Post subject:

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

Here is a second example of the new version of the nrc notation : the hardest (in the NRCZT sense) puzzle in the gsf-cb collection of 5,926,343 controlled-bias
I don't plan to give too many examples, but it is interesting to see, on a few hard cases, how compact the nrc notation is.
The shape of the solution path gives a rough idea of how the difficulty varies with time.

Code:

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

Code:

```
_____________________________________________________________________________________________________________________________
*****  SudoRules version 13.7wter  *****
1...5...9...7...3.87......4..8......53..9.6.....3.24...6...48....59..31...1......
singles ==> r4c9 = 3, r2c2 = 5, r9c8 = 4
interaction column c1 with block b7 for number 3 ==> r7c3 <> 3
interaction row r6 with block b6 for number 5 ==> r4c8 <> 5, r4c7 <> 5
interaction column c8 with block b3 for number 6 ==> r2c9 <> 6
nrc-chain[2]  b2n4{r2c5 r1c4} - r5n4{c4 c3} ==> r2c3 <> 4
nrczt-whip[2]  c2n9{r6 r9} - c7n9{r9 .} ==> r4c1 <> 9
nrczt-whip[4]  r7n1{c5 c4} - r3n1{c4 c7} - c7n5{r3 r9} - b8n5{r9c6 .} ==> r2c5 <> 1
nrczt-whip[12]  r3n9{c6 c3} - c3n3{r3 r1} - r1c6{n3 n8} - r8c6{n8 n7} - r5c6{n7 n1} - r2c6{n1 n9} - r2n8{c6 c9} - c9n1{r2
nrczt-whip[14]  r2n4{c5 c1} - c3n4{r1 r5} - c2n4{r4 r8} - r1c2{n4 n2} - b4n2{r4c2 r4c1} - r8n2{c1 c9} - c7n2{r9 r3} - c7n5
nrczt-whip[10]  r5n2{c9 c3} - c3n4{r5 r1} - r1c2{n4 n2} - r2n2{c1 c9} - b3n8{r2c9 r1c8} - c8n2{r1 r7} - b9n9{r7c8 r9c7} -
nrczt-whip[8]  b9n9{r7c8 r9c7} - c7n5{r9 r3} - c8n5{r3 r6} - c8n9{r6 r4} - c2n9{r4 r6} - c2n1{r6 r4} - r4c7{n1 n7} - c9n7{
nrczt-whip[7]  b9n7{r7c9 r9c7} - b9n9{r9c7 r7c8} - r4c8{n9 n2} - r5n2{c9 c3} - c3n4{r5 r1} - r1c2{n4 n2} - r1c7{n2 .} ==>
nrczt-whip[7]  b9n7{r7c9 r9c7} - b9n9{r9c7 r7c8} - r4c8{n9 n2} - r5n2{c9 c3} - c3n4{r5 r1} - r1c2{n4 n2} - r1c7{n2 .} ==>
interaction column c9 with block b9 ==> r9c7 <> 7
nrczt-whip[10]  b2n2{r3c4 r1c4} - c7n2{r1 r9} - b9n9{r9c7 r7c8} - r4c8{n9 n7} - r5c8{n7 n8} - c4n8{r5 r9} - r9c2{n8 n9} -
nrczt-whip[10]  r3c8{n6 n5} - r6n5{c8 c9} - b9n5{r9c9 r9c7} - c6n5{r9 r4} - b5n6{r4c6 r4c4} - c4n5{r4 r7} - r7n1{c4 c5} -
nrczt-whip[14]  r1c2{n2 n4} - c3n4{r1 r5} - r5n2{c3 c9} - b9n2{r9c9 r9c7} - c7n9{r9 r4} - r4c8{n9 n7} - r5c8{n7 n8} - r5c4
nrczt-whip[14]  r1c2{n2 n4} - c3n4{r1 r5} - b4n2{r5c3 r4c2} - c2n1{r4 r6} - c2n9{r6 r9} - c7n9{r9 r4} - c7n7{r4 r1} - b3n2
nrczt-whip[13]  c7n5{r3 r9} - c7n9{r9 r4} - c7n1{r4 r2} - r2n2{c7 c3} - r1c2{n2 n4} - c3n4{r1 r5} - c4n4{r5 r4} - r4n5{c4
nrczt-whip[11]  r3c8{n6 n5} - r6n5{c8 c9} - r7n5{c9 c4} - r9n5{c6 c7} - r3c7{n5 n1} - b6n1{r4c7 r5c9} - c4n1{r5 r4} - c6n1
nrczt-whip[13]  b2n4{r2c5 r1c4} - r5n4{c4 c3} - c2n4{r4 r8} - r1c2{n4 n2} - c3n2{r3 r7} - c3n7{r7 r6} - c3n6{r6 r1} - r1n3
[b]nrczt-whip[16]  r1c2{n2 n4} - c3n4{r1 r5} - c4n4{r5 r4} - c1n4{r4 r8} - r8c2{n4 n8} - r9c2{n8 n9} - b9n9{r9c7 r7c8} - r
2[/b]
nrczt-whip[14]  r8n4{c1 c2} - c2n8{r8 r9} - c2n2{r9 r1} - b1n4{r1c2 r1c3} - r5n4{c3 c4} - c4n8{r5 r1} - r2n8{c6 c9} - r2n2
nrc-chain[3]  b7n4{r8c1 r8c2} - b4n4{r4c2 r5c3} - b4n2{r5c3 r4c1} ==> r8c1 <> 2
nrczt-whip[10]  b4n2{r4c1 r5c3} - b4n4{r5c3 r4c2} - r8c2{n4 n8} - c2n2{r8 r1} - r9c2{n2 n9} - r9c7{n9 n5} - b8n5{r9c6 r7c4
```

```
nrczt-whip[10]  r6n5{c8 c9} - r6n8{c9 c5} - r6n1{c5 c2} - b4n9{r6c2 r4c2} - b4n4{r4c2 r5c3} - r5c4{n4 n1} - c9n1{r5 r2} -
interaction row r6 with block b4 for number 9 ==> r4c2 <> 9
nrc-chain[3]  b4n1{r4c2 r6c2} - c2n9{r6 r9} - c7n9{r9 r4} ==> r4c7 <> 1
interaction column c7 with block b3 for number 1 ==> r2c9 <> 1
nrczt-whip[6]  c9n1{r5 r6} - c2n1{r6 r4} - b4n4{r4c2 r5c3} - r5c4{n4 n8} - r6n8{c5 c8} - r6n5{c8 .} ==> r5c6 <> 1
nrczt-whip[5]  r2n6{c1 c6} - c6n9{r2 r3} - c6n1{r3 r4} - r4c2{n1 n4} - c3n4{r5 .} ==> r1c3 <> 6
interaction block b1 with row r2 for number 6 ==> r2c6 <> 6
nrczt-whip[5]  r5n1{c9 c4} - b5n8{r5c4 r6c5} - r2n8{c5 c6} - c6n9{r2 r3} - c6n1{r3 .} ==> r5c9 <> 8
nrczt-whip[5]  c6n9{r3 r2} - c6n1{r2 r4} - r4c2{n1 n4} - c3n4{r5 r1} - r1n3{c3 .} ==> r3c6 <> 3
nrczt-whip-cn[5]  n9{r2c6 r3c6} - n1{r3c6 r4c6} - {n1 n4}r4c2 - n4{r5c3 r5c4} - {n8r5c4 .} ==> r2c6 <> 8
naked-pairs-in-a-block b2{r2c6 r3c6}{n1 n9} ==> r3c5 <> 1, r3c4 <> 1
interaction block b2 with column c6 for number 1 ==> r4c6 <> 1
nrct-chain[4]  r3c4{n2 n6} - r3c8{n6 n5} - c7n5{r3 r9} - b8n5{r9c6 r7c4} ==> r7c4 <> 2
nrct-chain[4]  r3c4{n2 n6} - r3c8{n6 n5} - c7n5{r3 r9} - r9c4{n5 n2} ==> r1c4 <> 2
interaction block b2 with row r3 for number 2 ==> r3c3 <> 2
nrc-chain[5]  c6n3{r9 r1} - r3n3{c5 c3} - r3n9{c3 c6} - r3n1{c6 c7} - c7n5{r3 r9} ==> r9c6 <> 5
hidden-single-in-column c6 ==> r4c6 = 5
nrc-chain[4]  r3c5{n3 n2} - c4n2{r3 r9} - c4n5{r9 r7} - b8n1{r7c4 r7c5} ==> r7c5 <> 3
singles ==> r7c1 = 3, r4c1 = 2, r5c8 = 2, r7c8 = 9, r4c8 = 7, r4c7 = 9, r1c7 = 7
interaction row r1 with block b1 for number 2 ==> r2c3 <> 2
interaction row r4 with block b5 for number 6 ==> r6c5 <> 6
xyz-chain[3]  r1c8{n8 n6} - r1c4{n6 n4} - r2c5{n4 n8} ==> r1c6 <> 8
hidden-pairs-in-a-block b2{r1c4 r2c5}{n4 n8} ==> r1c4 <> 6
naked-pairs-in-a-column c4{r1 r5}{n4 n8} ==> r4c4 <> 4
x-wing-in-columns n4{c3 c4}{r1 r5} ==> r1c2 <> 4
singles ==> r1c2 = 2, r7c3 = 2
interaction column c3 with block b4 for number 7 ==> r6c1 <> 7
naked-pairs-in-a-column c5{r6 r7}{n1 n7} ==> r9c5 <> 7, r8c5 <> 7, r4c5 <> 1
nrc-chain[3]  r8c2{n8 n4} - c1n4{r8 r2} - r2c5{n4 n8} ==> r8c5 <> 8
xy-chain[3]  r1c6{n6 n3} - r3c5{n3 n2} - r8c5{n2 n6} ==> r9c6 <> 6, r8c6 <> 6
singles
GRID 0 SOLVED. LEVEL = NRCZT16, MOST COMPLEX RULE = NRCZT16
123456789
456789132
879231564
218645973
534897621
697312458
362174895
745928316
981563247
```

Last edited by denis_berthier on Tue Dec 15, 2009 5:33 am; edited 1 time in total

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ronk

Posted: Mon Nov 30, 2009 9:35 am Post subject:

Joined: 02 Nov 2005
Posts: 2653
Location: Southeastern USA

> **denis_berthier wrote:**
>
> ...
> the new version of the nrc notation
> ...
> nrczt-whip[16] r1c2{n2 n4} - c3n4{r1 r5} - c4n4{r5 r4} - c1n4{r4 r8} - r8c2{n4 n8} - r9c2{n8 n9} - b9n9{r9c7 r7c8} - r4c8{n9 n7} - r4c1

I like that a lot better -- especially since it looks more like the notation in one of my posts earlier this month.

> **here ronk wrote:**
>
> There's always some ambiguity when all cells are in a box-line intersection. For some reason, it's a bit more troublesome when in the last truth
>
> r1c3<>5 nrc[18]-whip n5b4{a6 a8} - n6b4{a8 a6} - n6c5{r5 r2} - n6c8{r2 r7} - n6r8{r8 r8} - {n6 n3}r1c2 - {n3 n9}r1c9 - {n9 n2}r1c4 -

I see a typo in that, but you'll see the similarity anyway.

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denis_berthier

Posted: Mon Nov 30, 2009 9:50 am Post subject:

Joined: 19 Jun 2007
Posts: 1085
Location: Paris, France

> **ronk wrote:**
>
> I like that a lot better -- especially since it looks more like the notation in one of my posts earlier this month.

Very good.
I hadn't noticed but I willingly grant you the priority for this form of explicitly writing the blocks.
Notice however that I don't use the internal coordinates in blocks, for the reasons mentioned in my post.
As for the explicit mentioning of the rc, rn, cn and bn spaces, it was already part of the previous strict version of the notation. The main reason I seldom used t

Notice also that there was no ambiguity in the last cell, as the whips were named whip-rc, whip-rn, ...

I'll take this opportunity to recall that other people have taken part in improving the nrc notation:
- David suggested to replace upper case letters by lower case;
- Paul introduced the square brackets at the end of the whips to write their length, as in whip[4]

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PIsaacson

Posted: Mon Nov 30, 2009 9:50 pm Post subject:

Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

Denis & Ron,

I think changing the notation makes sense, especially if the prefix is listed in Allan's syntax: rNc dRr dCc dBb. That way, there's no conversion required when ad
(RC/RN/CN/BN) that define the line/truth expressed by the prefix. I also prefer Ron's use of offsets within a box instead of expressing them as separate RnCn co

> **Code:**

```
1) RC space 1r2c3 to 4r2c3 as 2n3{n1 n4} - or would it "look better" as 2n3{d1 d4}???
2) RN space 1r2c3 to 1r2c8 as 1r2{c3 c8}
3) CN space 1r2c3 to 1r8c3 as 1c3{r2 r8}
4) BN space 1r2c3 to 1r3c2 as 1b1{a6 a8} - using Ron's "a" instead of my "x" for offsets within a box
```

Sorry for the delayed input/opinion, but everyone's got one!

Cheers,
Paul

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PIsaacson Posted: Tue Dec 01, 2009 3:03 am Post subject:

Joined: 02 Jul 2008
Posts: 344
Location: Campbell, CA

As a demonstration of a tentative Allan Barker SLG-esk nrczt notation, here's a comparison solution log from the above example taken from the suexg-cb 250k

Code:

```
5......72..4.2.....8.1.56.......94....3....982...3.7...1.3..9...2691..5.....56...

 5          369        19         |468        4689       348        |138        7          2
 13679      3679       4          |678        2          378        |1358       138        1359
 379        8          279        |1          479        5          |6          34         349
 ---------- ---------- ---------- +---------- ---------- ---------- +---------- ---------- ----------
 1678       567        1578       |25678      678        9          |4          1236       1356
 1467       4567       3          |24567      467        1247       |125        9          8
 2          4569       1589       |4568       3          148        |7          16         156
 ---------- ---------- ---------- +---------- ---------- ---------- +---------- ---------- ----------
 478        1          578        |3          478        2478       |9          2468       467
 3478       2          6          |9          1          478        |38         5          347
 34789      3479       789        |2478       5          6          |1238       12348      1347

  1) r3c3 <= 2 hidden single in b1
  2) r7c3 <= 5 hidden single in r7
  3) r3c5 <> 4 pointing pair b3/r3
  4) r5c6 <> 2 nrc[02]-chain r4n2{c4 c8} - r7n2{c8 c6}
  5) r7c6 <= 2 hidden single in c6
  6) r9c8 <> 3 nrc[03]-whip  r4n3{c8 c9} - r8n3{c9 c1} - r3n3{c1 c8}
  7) r9c9 <> 3 nrc[03]-whip  r4n3{c9 c8} - r3n3{c8 c1} - c2n3{r1 r2}
  8) r2c7 <> 3 nrc[03]-whip  c7n5{r2 r5} - b6n2{57 48} - c8n3{r4 r2}
  9) r2c7 <> 8 nrc[05]-chain r8c7{d8 d3} - r1c7{d3 d1} - r1c3{d1 d9} - r2n9{c1 c9} - r2n5{c9 c7}
 10) r8c1 <> 7 nrc[06]-whip  r3n7{c1 c5} - r7n7{c5 c9} - r7n6{c9 c8} - r6c8{d6 d1} - c6n1{r6 r5} - c6n7{r5 r8
 11) r4c1 <> 7 nrc[07]-whip  r3n7{c1 c5} - r7n7{c5 c9} - r7n6{c9 c8} - r6c8{d6 d1} - r4n1{c8 c3} - r1c3{d1 d9
 12) r9c7 <> 8 nrc[08]-whip  r8c7{d8 d3} - r1c7{d3 d1} - r1c3{d1 d9} - c5n9{r1 r3} - r3n7{c5 c1} - c1n9{r3 r9
 13) r4c4 <> 6 nrc[09]-whip  c4n2{r4 r5} - b6n2{57 48} - r4n3{c8 c9} - r4n5{c9 c2} - c4n5{r4 r6} - c9n5{r6 r2
 14) r5c1 <> 7 nrc[10]-whip  r2n7{c1 c2} - c6n7{r2 r8} - c4n7{r9 r4} - r4n2{c4 c8} - r4n3{c8 c9} - r8c9{d3 d4
 15) r4c4 <> 8 nrc[11]-whip  c4n2{r4 r5} - c4n5{r5 r6} - r6n8{c4 c3} - r6n9{c3 c2} - r6n4{c2 c6} - c6n1{r6 r5
 16) r9c1 <> 7 nrc[11]-whip  r2n7{c1 c2} - b2n7{24 35} - b8n7{75 86} - r5n7{c6 c4} - r5n2{c4 c7} - r5n5{c7 c2
 17) r9c9 <> 7 nrc[12]-whip  r8n7{c9 c6} - r7n7{c5 c1} - r2n7{c1 c2} - r4n7{c2 c3} - c4n7{r4 r5} - r5n2{c4 c7
 18) r2c9 <> 3 nrc[12]-chain r4n3{c9 c8} - r3n3{c8 c1} - r3n7{c1 c5} - r2c6{d7 d8} - r2c8{d8 d1} - r6c8{d1 d6
 19) r5c6 <> 4 nrc[09]-whip  c6n1{r5 r6} - r6c8{d1 d6} - r7n6{c8 c9} - c9n7{r7 r8} - r8c6{d7 d8} - c7n8{r8 r1
 20) r6c2 <> 6 nrc[09]-whip  r6c8{d6 d1} - c6n1{r6 r5} - r5c1{d1 d4} - b7n4{81 92} - r9c9{d4 d1} - r6c9{d1 d5
 21) r4c8 <> 6 nrc[11]-whip  r7n6{c8 c9} - r6n6{c9 c4} - c5n6{r4 r1} - c5n9{r1 r3} - r3n7{c5 c1} - r7n7{c1 c5
 22) r4c9 <> 6 nrc[12]-whip  r7n6{c9 c8} - r6c8{d6 d1} - r6c9{d1 d5} - r6n6{c9 c4} - c5n6{r4 r1} - c5n9{r1 r3
 23) r6c4 <> 6 nrc[01]-whip  c8n6{r6 r4}
 24) r1c7 <> 3 nrc[13]-whip  r3n3{c8 c1} - c2n3{r1 r9} - r8n3{c1 c9} - r8n7{c9 c6} - r9n7{c4 c3} - c1n7{r7 r2
 25) r2c1 <> 7 nrc[13]-whip  b2n7{24 35} - r7n7{c5 c9} - r7n6{c9 c8} - r6c8{d6 d1} - c6n1{r6 r5} - c1n1{r5 r4
 26) r2c1 <> 9 nrc[12]-whip  r1n9{c2 c5} - r3c5{d9 d7} - r2n7{c4 c2} - c2n6{r2 r1} - r4c2{d6 d5} - r5c2{d5 d4
 27) r2c2 <> 9 nrc[03]-whip  r1n9{c2 c5} - r3c5{d9 d7} - r2n7{c4 c1}
 28) r2c9 <= 9 hidden single in r2
 29) r2c7 <= 5 hidden single in b3
 30) r8c9 <> 3 claiming pair b9/c7
 31) r2c8 <> 3 naked subset[2] r3c89.<34>
 32) r3c1 <> 3 naked subset[2] r3c89.<34>
 33) r1c2 <> 9 nrc[12]-whip  c5n9{r1 r3} - r3n7{c5 c1} - c1n9{r3 r9} - c3n9{r9 r6} - r1c3{d9 d1} - r1c7{d1 d8
 34) r1c4 <> 8 nrc[10]-whip  c7n8{r1 r8} - c6n8{r8 r6} - r2n8{c6 c8} - b3n1{28 17} - r1c3{d1 d9} - r6n9{c3 c2
 35) r1c5 <> 8 nrc[10]-whip  r1n9{c5 c3} - r1n1{c3 c7} - c7n8{r1 r8} - c6n8{r8 r6} - r6c3{d8 d1} - r6n9{c3 c2
 36) r1c6 <> 3 nrc[10]-whip  r1c2{d3 d6} - c4n6{r1 r2} - r2n8{c4 c6} - r2n7{c6 c2} - r4n7{c2 c3} - r9n7{c3 c4
 37) r1c2 <= 3 hidden single in r1
 38) r2c6 <= 3 hidden single in r2
 39) r2c4 <> 6 pointing pair b1/r2
 40) r1c3 <> 1 nrc[10]-whip  b1n9{13 31} - c1n7{r3 r7} - r9n7{c2 c4} - r2c4{d7 d8} - r1c6{d8 d4} - r8c6{d4 d8

     singles from here on

539468172164723589782195643671289435453671298298534716815342967326917854947856321 puzzle 1 givens 27 nrczt 13
```

I've uploaded the *.sud file for loading into XSudo so that the chains and the logic can be compared to the solution log.

It's at http://pisaacson.fileave.com/XSudo/suexg-cb.bin Rename to *.sud and copy to the xsudo/puzzle directory (c:/program files/xsudo/puzzle for mingw). Th
elimination. Currently, I use LogicTools->Find Base/Cover Sets to get a better SLG position.

[edit] Changed the output to conform to Denis' new nrczt notation with the exception of BN notation wherein I altered the bracketed {RnCn RnCn} by dropping

Cheers,
Paul

Last edited by PIsaacson on Tue Dec 01, 2009 9:50 am; edited 1 time in total

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ronk Posted: Tue Dec 01, 2009 3:30 am Post subject:

Joined: 02 Nov 2005

denis_berthier wrote:

- if 2D-space = bn, then the block now appears explicitly, but Li and Ri are still written in the "rc style": r1c1, r2c2... ; putting instead a coordi

Posts: 2653
Location: Southeastern USA

with the previous and next candidates;

PIsaacson, despite my occasional usage of b1{a1 .... a9} in chain notaton, I've got to agree with **Denis**. It makes it more difficult for the reader.
The priority change is that the strong set is now outside the curly brackets. That change makes the notaton easier to read (fewer characters for one thing) ... ar

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