

## 5.174 `ith_pos_different_from_0`

	DESCRIPTION	LINKS	AUTOMATON
<b>Origin</b>	N. Beldiceanu		
<b>Constraint</b>	<code>ith_pos_different_from_0(ITH, POS, VARIABLES)</code>		
<b>Arguments</b>	<code>ITH</code> : <code>int</code> <code>POS</code> : <code>dvar</code> <code>VARIABLES</code> : <code>collection(var-dvar)</code>		
<b>Restrictions</b>	$ITH \geq 1$ $ITH \leq  VARIABLES $ $POS \geq ITH$ $POS \leq  VARIABLES $ <code>required(VARIABLES, var)</code>		
<b>Purpose</b>	POS is the position of the $ITH^{th}$ non-zero item of the sequence of variables VARIABLES.		
<b>Example</b>	<code>(2, 4, (3, 0, 0, 8, 6))</code> <p>The <code>ith_pos_different_from_0</code> constraint holds since 4 corresponds to the position of the <math>2^{th}</math> non-zero item of the sequence 3 0 0 8 6.</p>		
<b>Typical</b>	$ VARIABLES  > 1$ <code>range(VARIABLES.var) &gt; 1</code> <code>atleast(1, VARIABLES, 0)</code>		
<b>Symmetry</b>	An occurrence of a value of <code>VARIABLES.var</code> that is different from 0 can be <code>replaced</code> by any other value that is also different from 0.		
<b>Keywords</b>	<p><b>characteristic of a constraint:</b> <code>joker value</code>, <code>automaton</code>, <code>automaton with counters</code>.</p> <p><b>constraint network structure:</b> <code>alpha-acyclic constraint network(3)</code>.</p> <p><b>constraint type:</b> <code>data constraint</code>.</p> <p><b>modelling:</b> <code>table</code>.</p>		

**Automaton**

Figure 5.352 depicts the automaton associated with the `ith_pos_different_from_0` constraint. To each variable  $VAR_i$  of the collection `VARIABLES` corresponds a 0-1 signature variable  $S_i$ . The following signature constraint links  $VAR_i$  and  $S_i$ :  $VAR_i = 0 \Leftrightarrow S_i$ .

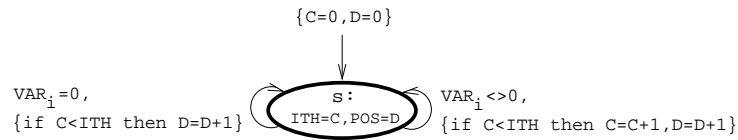


Figure 5.352: Automaton of the `ith_pos_different_from_0` constraint

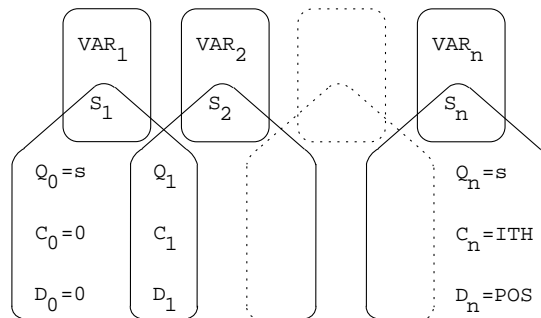


Figure 5.353: Hypergraph of the reformulation corresponding to the automaton of the `ith_pos_different_from_0` constraint