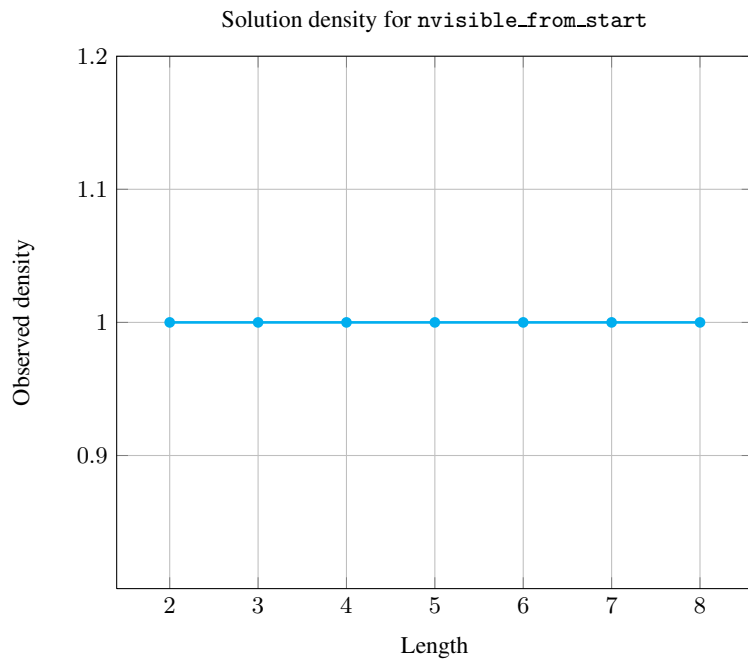
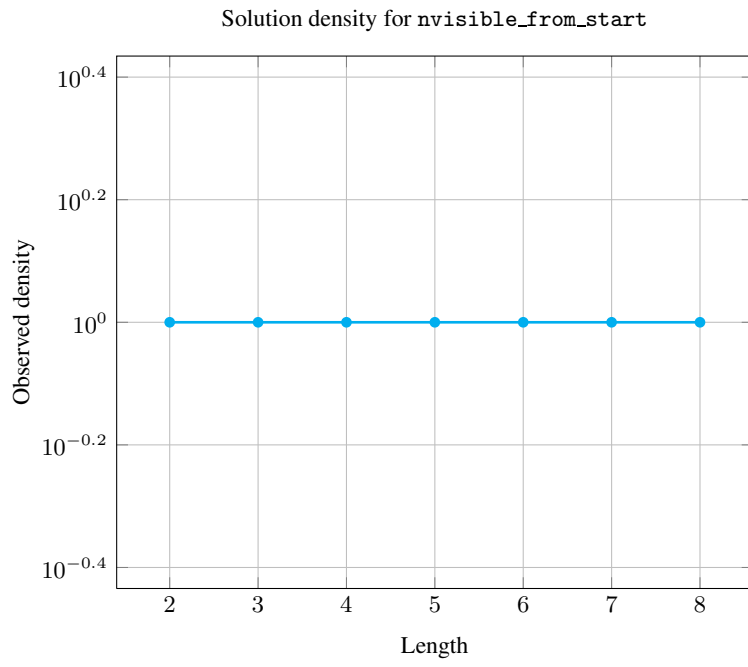


## 5.293 `nvisible_from_start`

	DESCRIPTION	LINKS	AUTOMATON
<b>Origin</b>	Derived from a puzzle called skyscraper		
<b>Constraint</b>	<code>nvisible_from_start(N, VARIABLES)</code>		
<b>Synonyms</b>	<code>nvisible</code> , <code>nvisible_from_left</code> .		
<b>Arguments</b>	N : <code>dvar</code> VARIABLES : <code>collection(var-dvar)</code>		
<b>Restrictions</b>	<code>required(VARIABLES, var)</code> $N \geq \min(1,  \text{VARIABLES} )$ $N \leq  \text{VARIABLES} $		
<b>Purpose</b>	The $i^{\text{th}}$ ( $1 \leq i \leq  \text{VARIABLES} $ ) variable of the sequence <code>VARIABLES</code> is <i>visible</i> if and only if all variables before the $i^{\text{th}}$ variable are strictly smaller than the $i^{\text{th}}$ variable itself. <code>N</code> is the total number of visible variables of the sequence of variables <code>VARIABLES</code> .		
<b>Example</b>	<div style="border: 1px solid blue; padding: 5px; display: inline-block;"> <math>(3, \langle 1, 6, 2, 1, 4, 8, 2 \rangle)</math>  <math>(1, \langle 8, 6, 2, 1, 4, 8, 2 \rangle)</math>  <math>(7, \langle 0, 2, 3, 5, 6, 7, 9 \rangle)</math> </div> <p>The first <code>nvisible_from_start</code> constraint holds since the sequence 1 6 2 1 4 8 2 contains three visible items that respectively correspond to the first, second and sixth items.</p>		
<b>Typical</b>	$ \text{VARIABLES}  > 2$ <code>range(VARIABLES.var) &gt; 2</code>		
<b>Symmetry</b>	One and the same constant can be <code>added</code> to the <code>var</code> attribute of all items of <code>VARIABLES</code> .		
<b>Arg. properties</b>	<b>Functional dependency:</b> <code>N</code> determined by <code>VARIABLES</code> .		
<b>Counting</b>			

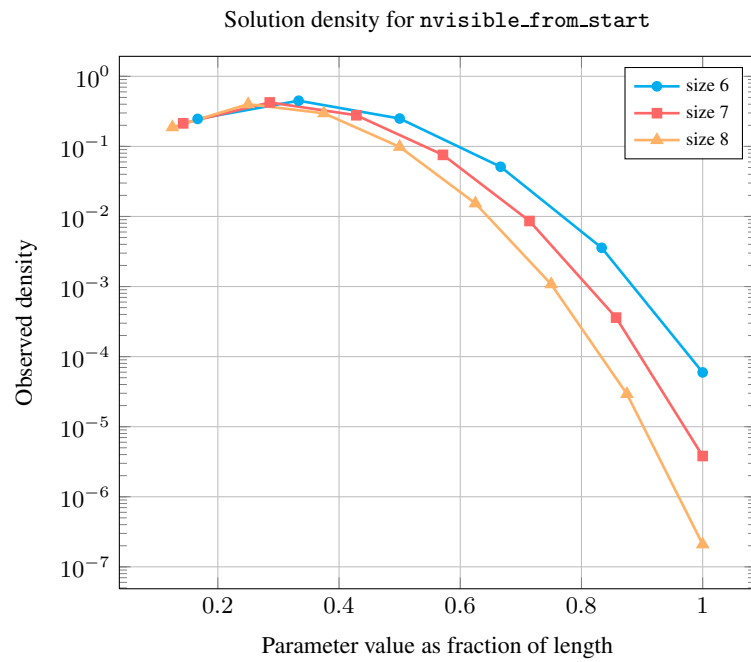
Length ( $n$ )	2	3	4	5	6	7	8
Solutions	9	64	625	7776	117649	2097152	43046721

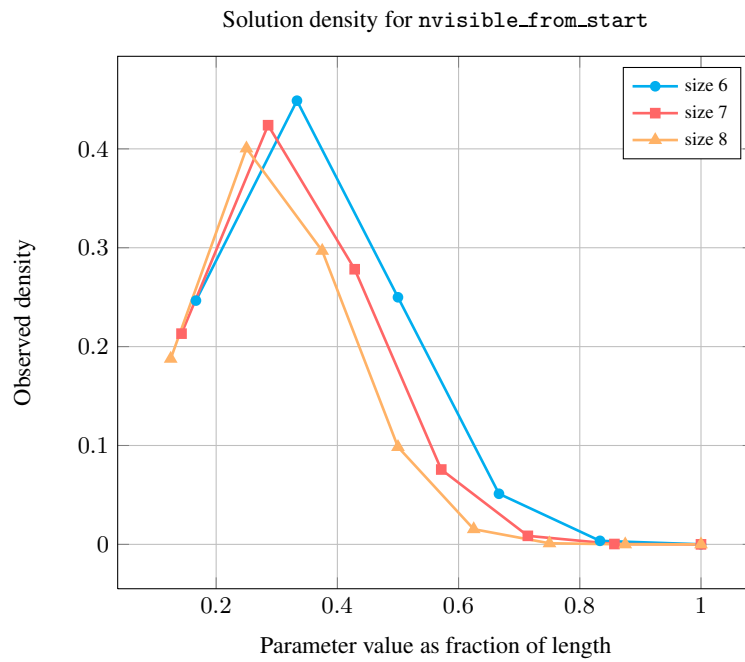
Number of solutions for `nvisible_from_start`: domains  $0..n$



Length ( $n$ )		2	3	4	5	6	7	8
Total		9	64	625	7776	117649	2097152	43046721
Parameter value	1	6	30	225	2275	29008	446964	8080425
	2	3	30	305	3675	52794	889056	17238570
	3	-	4	90	1610	29400	583548	12780180
	4	-	-	5	210	6020	158760	4238367
	5	-	-	-	6	420	18060	661500
	6	-	-	-	-	7	756	46410
	7	-	-	-	-	-	8	1260
	8	-	-	-	-	-	-	9

Solution count for `nvisible_from_start`: domains  $0..n$



**See also**

**implied by:** [increasing\\_nvalue](#).

**implies:** [atleast\\_nvalue](#).

**related:** [nvisible\\_from\\_end](#) (count from the end of the sequence rather than from the start).

**Keywords**

**combinatorial object:** [sequence](#).

**constraint arguments:** [pure functional dependency](#).

**modelling:** [functional dependency](#).

Automaton

Figure 5.609 depicts the automaton associated with the `nvisible_from_start` constraint.

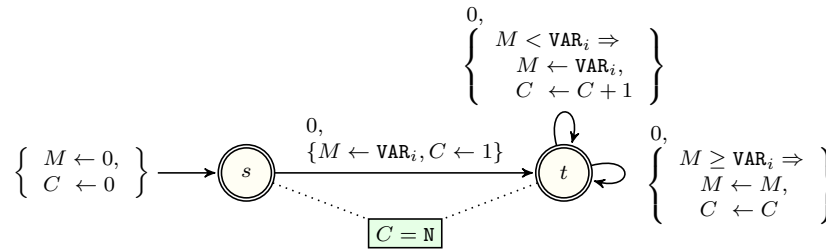


Figure 5.609: Automaton of the `nvisible_from_start` constraint with two counters  $M$  and  $C$ , where  $M$  records the largest value encountered so far, and  $C$  the number of visible values from the left hand side of the sequence  $\text{VAR}_1, \text{VAR}_2, \dots, \text{VAR}_n$

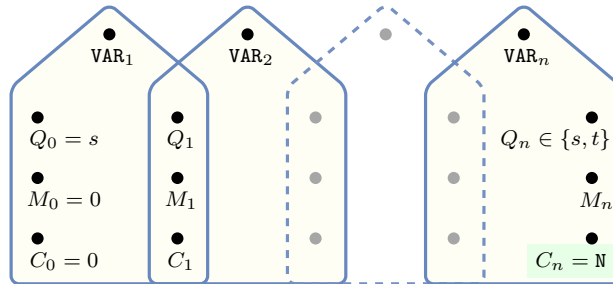


Figure 5.610: Hypergraph of the reformulation corresponding to the automaton (with two counters) of the `nvisible_from_start` constraint (since all states of the automaton are accepting there is no restriction on the last variable  $Q_n$ )

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