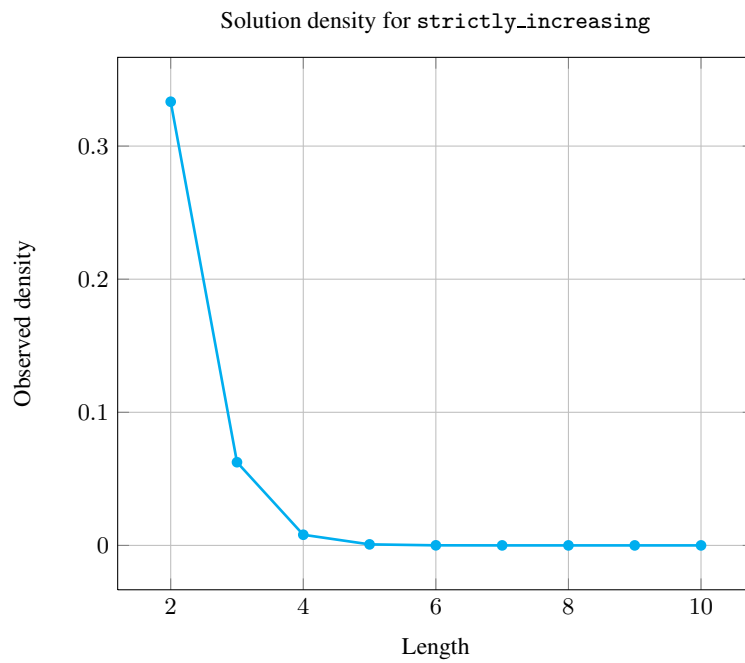
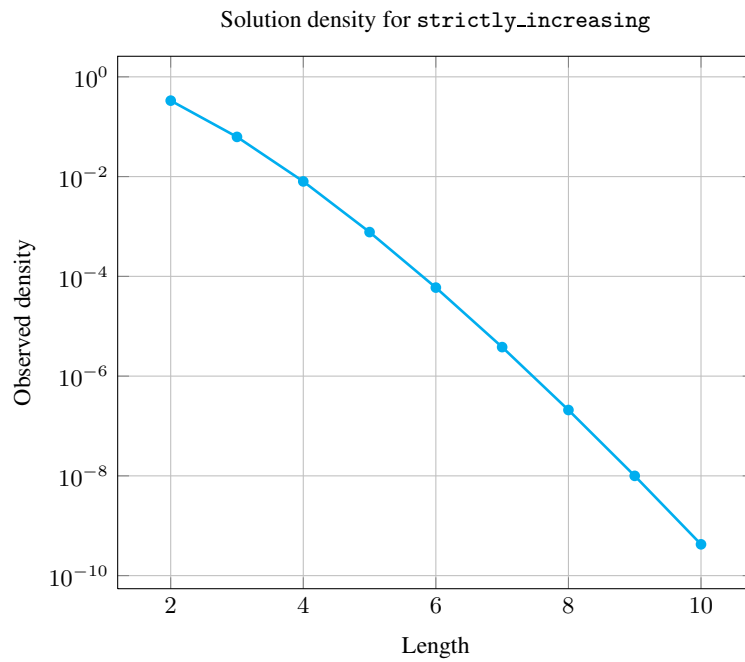


5.380 `strictly_increasing`

	DESCRIPTION	LINKS	GRAPH	AUTOMATON
Origin	KOALOG			
Constraint	<code>strictly_increasing(VARIABLES)</code>			
Argument	<code>VARIABLES : collection(var-dvar)</code>			
Restriction	<code>required(VARIABLES, var)</code>			
Purpose	The variables of the collection VARIABLEs are strictly increasing.			
Example	<div style="border: 1px solid blue; padding: 2px; display: inline-block;">((1, 3, 6, 8))</div> The <code>strictly_increasing</code> constraint holds since $1 < 3 < 6 < 8$.			
Typical	<code> VARIABLES > 2</code>			
Symmetry	One and the same constant can be <code>added</code> to the <code>var</code> attribute of all items of VARIABLEs.			
Arg. properties	<code>Contractible</code> wrt. VARIABLEs.			
Counting				

Length (n)	2	3	4	5	6	7	8	9	10
Solutions	3	4	5	6	7	8	9	10	11

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



Systems [increasingNValue](#) in [Choco](#), [rel](#) in [Gecode](#).

Used in [golomb](#), [int_value_precede_chain](#), [max_occ_of_tuples_of_values](#).

See also

common keyword: decreasing (*order constraint*).

comparison swapped: strictly_decreasing.

implied by: golomb.

implies: alldifferent, increasing.

uses in its reformulation: alldifferent.

Keywords

characteristic of a constraint: automaton, automaton without counters, reified automaton constraint.

constraint network structure: sliding cyclic(1) constraint network(1).

constraint type: decomposition, order constraint.

filtering: arc-consistency.

Arc input(s)	VARIABLES
Arc generator	<i>PATH</i> \mapsto <i>collection</i> (variables1, variables2)
Arc arity	2
Arc constraint(s)	variables1.var < variables2.var
Graph property(ies)	NARC = VARIABLES - 1

Graph model

Parts (A) and (B) of Figure 5.739 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NARC** graph property, the arcs of the final graph are stressed in bold.

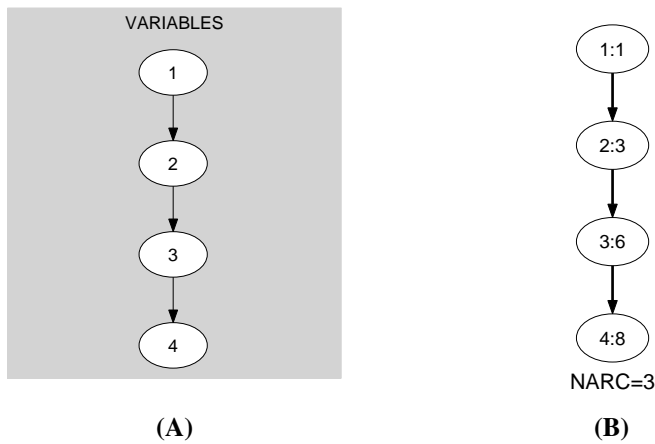


Figure 5.739: Initial and final graph of the `strictly_increasing` constraint

Automaton

Figure 5.740 depicts the automaton associated with the `strictly_increasing` constraint. To each pair of consecutive variables ($\text{VAR}_i, \text{VAR}_{i+1}$) of the collection `VARIABLES` corresponds a 0-1 signature variable S_i . The following signature constraint links VAR_i , VAR_{i+1} and S_i : $\text{VAR}_i \geq \text{VAR}_{i+1} \Leftrightarrow S_i$.



Figure 5.740: Automaton of the `strictly_increasing` constraint

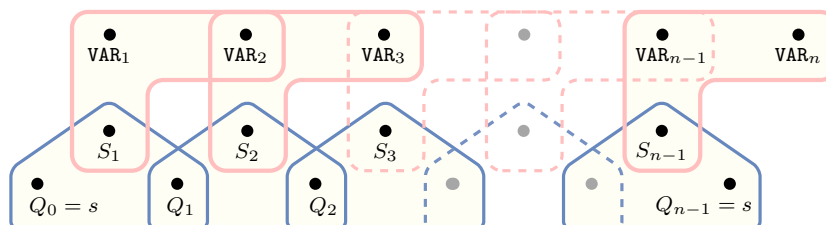


Figure 5.741: Hypergraph of the reformulation corresponding to the automaton of the `strictly_increasing` constraint

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