5.349 size_max_starting_seq_alldifferent

DESCRIPTION LINKS GRAPH

Origin Inspired by size_max_seq_alldifferent.

Constraint size_max_starting_seq_alldifferent(SIZE, VARIABLES)

Synonyms size_maximal_starting_sequence_alldiff,
size_maximal_starting_sequence_alldistinct,
size_maximal_starting_sequence_alldifferent.

Arguments

SIZE	:	dvar
VARIABLES	:	collection(var−dvar)

Restrictions

SIZE ≥ 0
SIZE $\leq |$VARIABLES$|$
required(VARIABLES, var)

Purpose SIZE is the size of the maximal sequence (among all sequences of consecutive variables of the collection VARIABLES starting at position one) for which the alldifferent constraint holds.

Example

$(4, \langle 9, 2, 4, 5, 2, 7, 4\rangle)$
$(7, \langle 9, 2, 4, 5, 1, 7, 8\rangle)$
$(6, \langle 9, 2, 4, 5, 1, 7, 9\rangle)$

The first size_max_starting_seq_alldifferent constraint holds since the constraint alldifferent($\langle$var $-$ 9, var $-$ 2, var $-$ 4, var $-$ 5$\rangle$) holds and since alldifferent($\langle$var $-$ 9, var $-$ 2, var $-$ 4, var $-$ 5, var $-$ 2$\rangle$) does not hold.

Typical

SIZE > 2
SIZE $< |$VARIABLES$|$
range(VARIABLES.var) > 1

Symmetry One and the same constant can be added to the var attribute of all items of VARIABLES.

Arg. properties

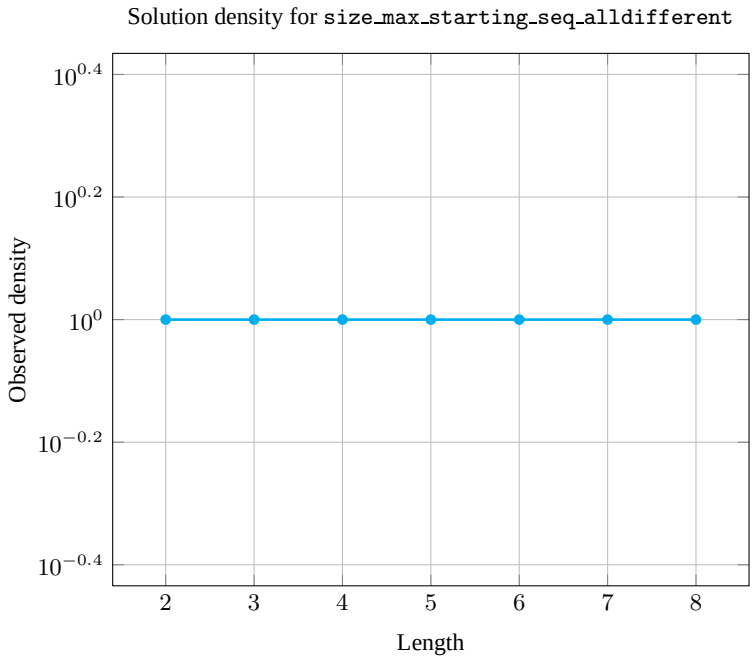
Functional dependency: SIZE determined by VARIABLES.

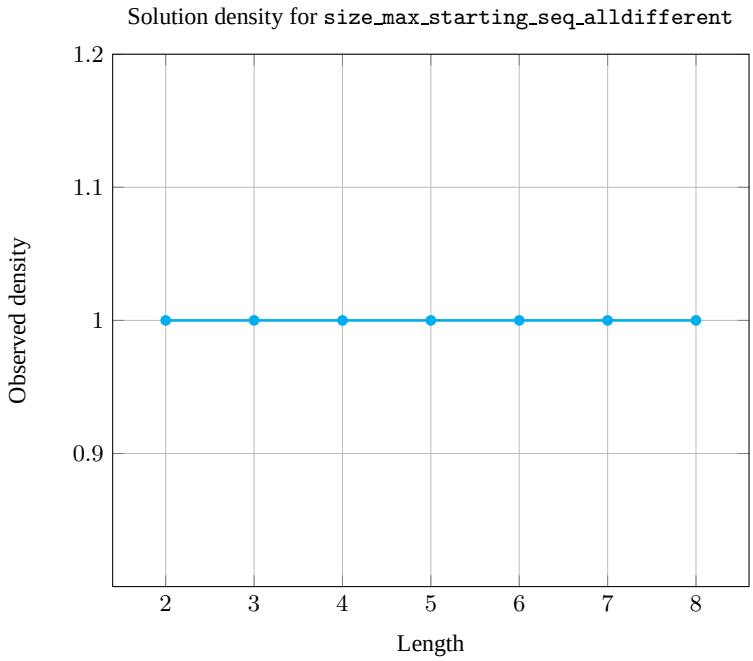
Remark A conditional constraint [285] with the specific structure that one can relax the constraints on the last variables of the collection VARIABLES.

Counting

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

Number of solutions for size_max_starting_seq_alldifferent: domains $0..n$

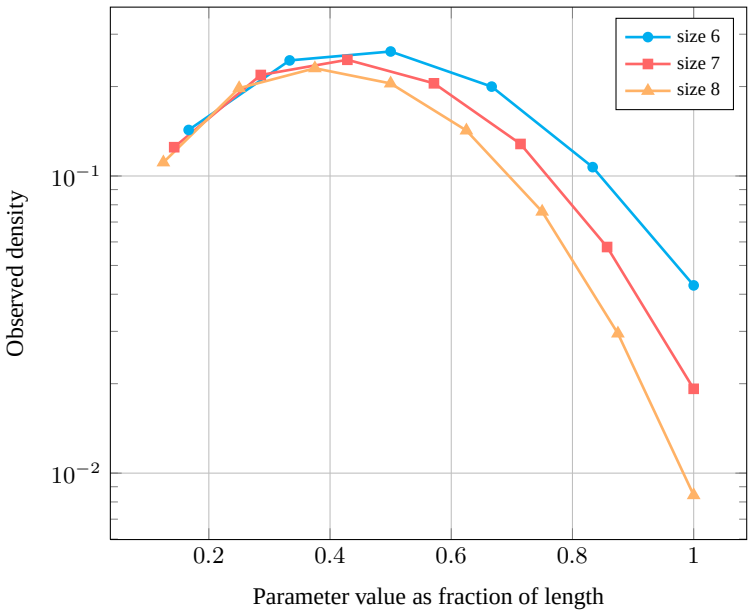

Solution density for size_max_starting_seq_alldifferent
Observed density
$10^{0.4}$
$10^{0.2}$
10^{0}
$10^{-0.2}$
$10^{-0.4}$
2
3
4
5
6
7
8
Length


Solution density for size_max_starting_seq_alldifferent
Observed density
1.2
1.1
1
0.9
2
3
4
5
6
7
8
Length

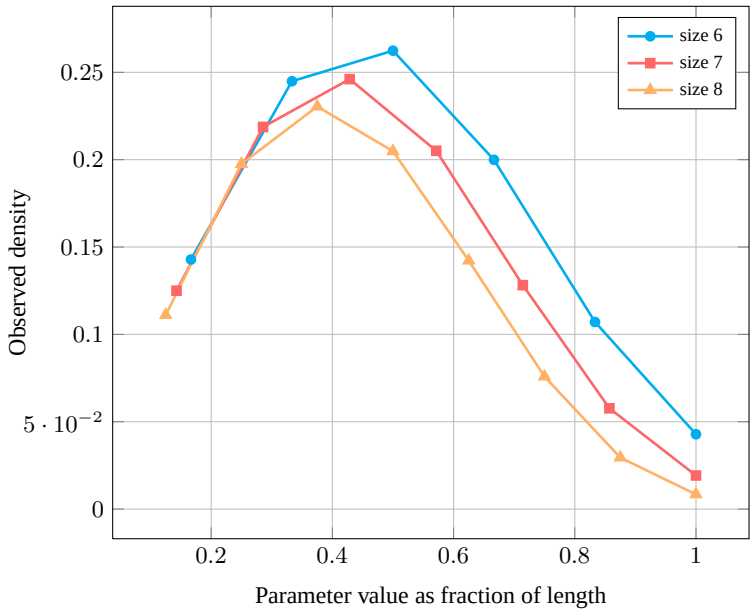
Length (n)		2	3	4	5	6	7	8
Total		9	64	625	7776	117649	2097152	43046721
Parameter value	1	3	16	125	1296	16807	262144	4782969
	2	6	24	200	2160	28812	458752	8503056
	3	-	24	180	2160	30870	516096	9920232
	4	-	-	120	1440	23520	430080	8817984
	5	-	-	-	720	12600	268800	6123600
	6	-	-	-	-	5040	120960	3265920
	7	-	-	-	-	-	40320	1270080
	8	-	-	-	-	-	-	362880

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

Solution density for `size_max_starting_seq_alldifferent`



Solution density for `size_max_starting_seq_alldifferent`



See also **common keyword:** `alldifferent`, `open_alldifferent`, `size_max_seq_alldifferent` *(all different,disequality)*.

implies: `atleast_nvalue`.

Keywords **characteristic of a constraint:** all different, disequality, hypergraph.

combinatorial object: sequence.

constraint arguments: pure functional dependency.

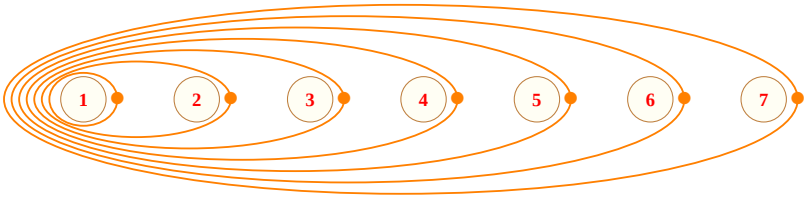
constraint type: sliding sequence constraint, open constraint, conditional constraint.

modelling: functional dependency.

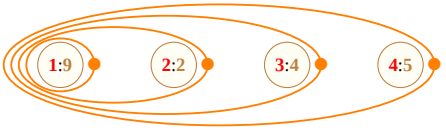
Arc input(s)	VARIABLES
Arc generator	$PATH\_1 \mapsto$ collection
Arc arity	$*$
Arc constraint(s)	alldifferent(collection)
Graph property(ies)	NARC$=$ SIZE

Graph model Note that this is an example where the arc constraints do not have the same arity. However they correspond to the same constraint.

Parts (A) and (B) of Figure 5.701 respectively show the initial and final graph associated with the first example of the **Example** slot.



(A)



(B)

Figure 5.701: (A) Initial and (B) final graph of the size_max_starting_seq_alldifferent$(4, \langle 9, 2, 4, 5, 2, 7, 4 \rangle)$ constraint of the first example of the **Example** slot where each ellipse represents an hyperedge corresponding to an alldifferent constraint (e.g., the fourth ellipse represents the constraint alldifferent$\langle 9, 2, 4, 5 \rangle$)