5.209 k_same_interval

DESCRIPTION LINKS GRAPH

Origin Derived from same_interval and from k_same.

Constraint k_same_interval(SETS, SIZE_INTERVAL)

Type
VARIABLES : collection(var−dvar)

Arguments

SETS	:	collection(set − VARIABLES)
SIZE_INTERVAL	:	int

Restrictions
required(VARIABLES, var)
|VARIABLES| ≥ 1
required(SETS, set)
|SETS| > 1
same_size(SETS, set)
SIZE_INTERVAL > 0

Purpose Given a collection of |SETS| sets, each containing the same number of domain variables, the k_same_interval constraint forces a same_interval constraint between each pair of consecutive sets.

Example

$$\left(\left\langle \begin{array}{l} \texttt{set} - \langle 1,1,6,0,1,7 \rangle, \\ \texttt{set} - \langle 8,8,0,0,1,2 \rangle, \\ \texttt{set} - \langle 2,1,1,2,6,6 \rangle \end{array} \right\rangle, 3 \right)$$

In the example, the second argument SIZE_INTERVAL = 3 of the k_same_interval constraint defines the following family of intervals $[3 \cdot k, 3 \cdot k + 2]$, where k is an integer. The k_same_interval constraint holds since:

- The first and second collections of variables are assigned 4 values in the interval $[0, 2]$ as well as 2 values in the interval $[6, 8]$.
- The second and third collections of variables are also assigned 4 values in the interval $[0, 2]$ as well as 2 values in the interval $[6, 8]$.

Typical
|VARIABLES| > 1
SIZE_INTERVAL > 1

Symmetries
- Items of SETS are permutable.
- Items of SETS.set are permutable.
- An occurrence of a value of SETS.set.var that belongs to the k-th interval, of size SIZE_INTERVAL, can be replaced by any other value of the same interval.

Arg. properties
Contractible wrt. SETS.

See also

common keyword: `k_same` *(system of constraints)*.

implies: `k_used_by_interval`.

part of system of constraints: `same_interval`.

used in graph description: `same_interval`.

Keywords

characteristic of a constraint: sort based reformulation.

combinatorial object: permutation.

constraint type: system of constraints, decomposition.

modelling: interval.

Arc input(s)	SETS
Arc generator	$PATH \mapsto$ collection(set1, set2)
Arc arity	2
Arc constraint(s)	same_interval(set1.set, set2.set, SIZE_INTERVAL)
Graph property(ies)	NARC$= \lvert$SETS$\rvert - 1$

Graph model Parts (A) and (B) of Figure 5.481 respectively show the initial and final graph associated with the **Example** slot. To each vertex corresponds a collection of variables, while to each arc corresponds a same_interval constraint.

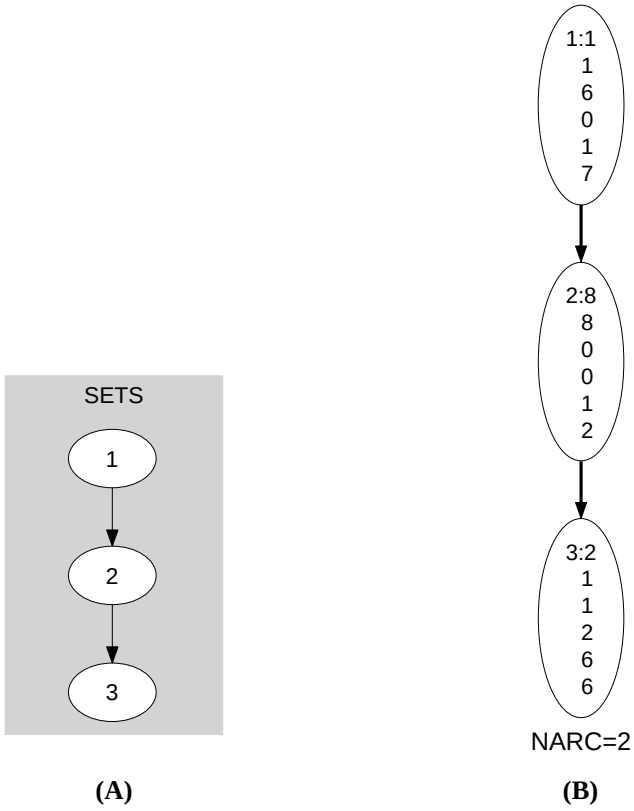

Figure 5.481: Initial and final graph of the k_same_interval constraint