

5.208 `k_same_interval`

	DESCRIPTION	LINKS	GRAPH
Origin	Derived from <code>same_interval</code> and from <code>k_same</code> .		
Constraint	<code>k_same_interval(SETS, SIZE_INTERVAL)</code>		
Type	VARIABLES : <code>collection(var-dvar)</code>		
Arguments	SETS : <code>collection(set - VARIABLES)</code> SIZE_INTERVAL : <code>int</code>		
Restrictions	<code>required(VARIABLES, var)</code> $ VARIABLES \geq 1$ <code>required(SETS, set)</code> $ SETS > 1$ <code>same_size(SETS, set)</code> $SIZE_INTERVAL > 0$		
Purpose	Given a collection of $ SETS $ sets, each containing the same number of domain variables, the <code>k_same_interval</code> constraint forces a <code>same_interval</code> constraint between each pair of consecutive sets.		
Example	$\left(\left\langle \begin{array}{l} \text{set} - \langle 1, 1, 6, 0, 1, 7 \rangle, \\ \text{set} - \langle 8, 8, 0, 0, 1, 2 \rangle, \\ \text{set} - \langle 2, 1, 1, 2, 6, 6 \rangle \end{array} \right\rangle, 3 \right)$		
	<p>In the example, the second argument $SIZE_INTERVAL = 3$ of the <code>k_same_interval</code> constraint defines the following family of intervals $[3 \cdot k, 3 \cdot k + 2]$, where k is an integer. The <code>k_same_interval</code> constraint holds since:</p> <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Items of SETS are <code>permutable</code>. • Items of SETS.set are <code>permutable</code>. • An occurrence of a value of SETS.set.var that belongs to the k-th interval, of size $SIZE_INTERVAL$, can be <code>replaced</code> by any other value of the same interval. 		
Arg. properties	<code>Contractible</code> 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	$\text{PATH} \mapsto \text{collection}(\text{set1}, \text{set2})$
Arc arity	2
Arc constraint(s)	$\text{same_interval}(\text{set1.set}, \text{set2.set}, \text{SIZE_INTERVAL})$
Graph property(ies)	$\text{NARC} = \text{SETS} - 1$

Graph model

Parts (A) and (B) of Figure 5.462 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.

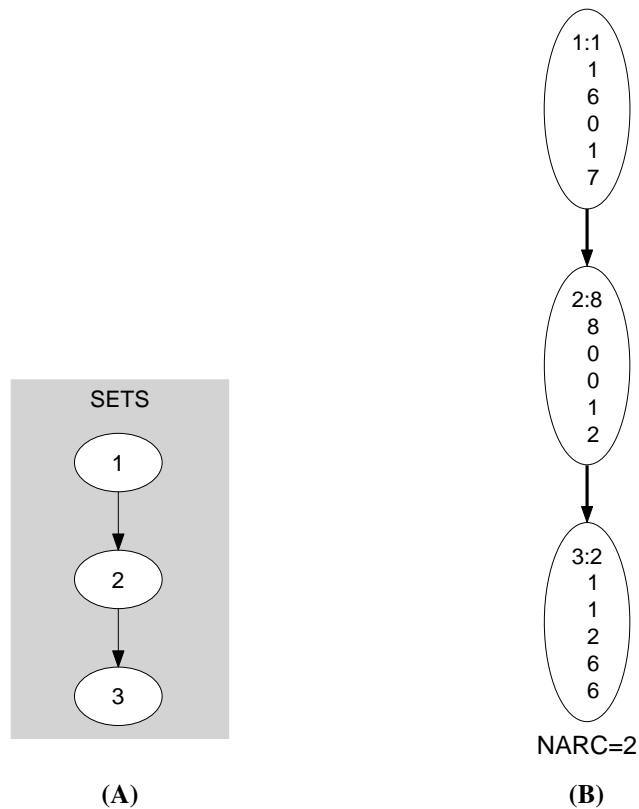


Figure 5.462: Initial and final graph of the $k_same_interval$ constraint

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