

5.394 symmetric

	DESCRIPTION	LINKS	GRAPH
Origin	[142]		
Constraint	symmetric(NODES)		
Argument	NODES : collection(index-int, succ-svar)		
Restrictions	required(NODES, [index, succ]) NODES.index ≥ 1 NODES.index $\leq \text{NODES} $ distinct(NODES, index)		
Purpose	Consider a digraph G described by the NODES collection. Select a subset of arcs of G so that the corresponding graph is symmetric (i.e., if there is an arc from i to j , there is also an arc from j to i).		
Example	$\left(\begin{array}{ll} \text{index} - 1 & \text{succ} - \{1, 2, 3\}, \\ \text{index} - 2 & \text{succ} - \{1, 3\}, \\ \text{index} - 3 & \text{succ} - \{1, 2\}, \\ \text{index} - 4 & \text{succ} - \{5, 6\}, \\ \text{index} - 5 & \text{succ} - \{4\}, \\ \text{index} - 6 & \text{succ} - \{4\} \end{array} \right)$		
	The symmetric constraint holds since the NODES collection depicts a symmetric graph.		
Typical	NODES > 2		
Symmetry	Items of NODES are permutable .		
Algorithm	The filtering algorithm for the symmetric constraint is given in [142, page 87]. It removes (respectively imposes) the arcs (i, j) for which the arc (j, i) is not present (respectively is present). It has an overall complexity of $O(n + m)$ where n and m respectively denote the number of vertices and the number of arcs of the initial graph.		
See also	common keyword: connected (<i>symmetric</i>). used in graph description: in_set .		
Keywords	constraint arguments: constraint involving set variables. constraint type: graph constraint. final graph structure: symmetric.		

Arc input(s)	NODES
Arc generator	<code>CLIQUE</code> \mapsto <code>collection(nodes1, nodes2)</code>
Arc arity	2
Arc constraint(s)	<code>in_set(nodes2.index, nodes1.succ)</code>
Graph class	<code>SYMMETRIC</code>

Graph model

Part (A) of Figure 5.749 shows the initial graph from which we start. It is derived from the set associated with each vertex. Each set describes the potential values of the succ attribute of a given vertex. Part (B) of Figure 5.749 gives the final graph associated with the **Example** slot.

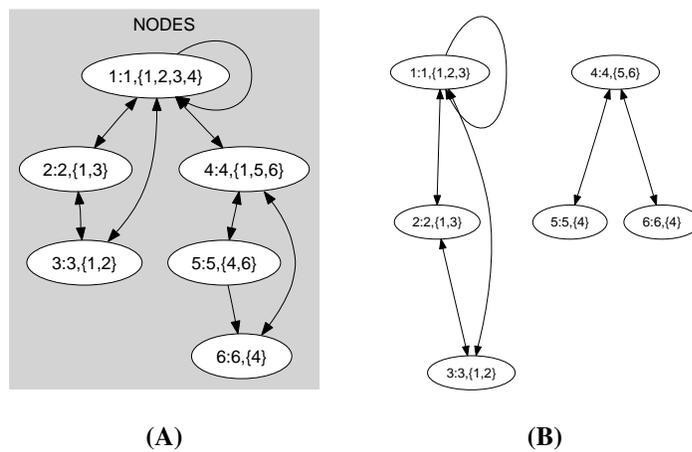


Figure 5.749: Initial and final graph of the symmetric set constraint