

5.109 dag

	DESCRIPTION	LINKS	GRAPH
Origin	[142]		
Constraint	dag(NODES)		
Argument	NODES : <code>collection(index-int, succ-svar)</code>		
Restrictions	<code>required(NODES, [index, succ])</code> <code>NODES.index ≥ 1</code> <code>NODES.index ≤ NODES </code> <code>distinct(NODES, index)</code> <code>NODES.succ ≥ 1</code> <code>NODES.succ ≤ NODES </code>		
Purpose	Consider a digraph G described by the NODES collection. Select a subset of arcs of G so that the corresponding graph does not contain any circuit.		
Example	$\left(\begin{array}{ll} \text{index} - 1 & \text{succ} - \{2, 4\}, \\ \text{index} - 2 & \text{succ} - \{3, 4\}, \\ \text{index} - 3 & \text{succ} - \emptyset, \\ \text{index} - 4 & \text{succ} - \emptyset, \\ \text{index} - 5 & \text{succ} - \{6\}, \\ \text{index} - 6 & \text{succ} - \emptyset \end{array} \right)$		
	The dag constraint holds since the NODES collection depicts a graph without circuit.		
Typical	<code> NODES > 2</code>		
Symmetry	Items of NODES are permutable .		
Algorithm	A filtering algorithm for the dag constraint is given in [142, page 90]. It removes potential arcs that would create a circuit of mandatory arcs.		
See also	used in graph description: in_set .		
Keywords	constraint arguments: constraint involving set variables . constraint type: graph constraint .		

Arc input(s)	NODES
Arc generator	$SELF \mapsto \text{collection}(\text{nodes})$
Arc arity	1
Arc constraint(s)	$\text{in_set}(\text{nodes.key}, \text{nodes.succ})$
Graph property(ies)	$NARC = 0$
Arc input(s)	NODES
Arc generator	$CLIQUE \mapsto \text{collection}(\text{nodes1}, \text{nodes2})$
Arc arity	2
Arc constraint(s)	$\text{in_set}(\text{nodes2.index}, \text{nodes1.succ})$
Graph property(ies)	$MAX_NSCC \leq 1$

Graph model

The first graph constraint removes the loop of each vertex. The second graph constraint forbids the creation of circuits involving more than one vertex.

Part (A) of Figure 5.241 shows the initial graph associated with the second graph constraint of the **Example** slot. This initial graph from which we start 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 5.241 gives the final graph associated with the **Example** slot.

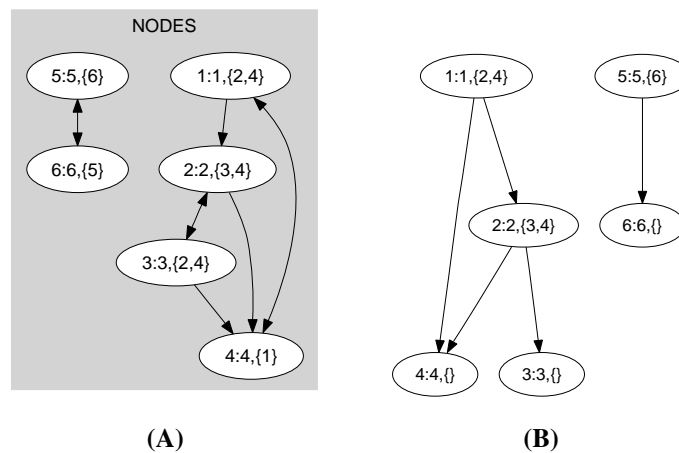


Figure 5.241: Initial and final graph of the dag set constraint