5.250 maximum_modulo

DESCRIPTION LINKS GRAPH

Origin Derived from maximum.

Constraint maximum_modulo(MAX, VARIABLES, M)

Arguments

MAX	:	dvar
VARIABLES	:	collection(var−dvar)
M	:	int

Restrictions

|VARIABLES| > 0
M > 0
required(VARIABLES, var)

Purpose MAX is a maximum value of the collection of domain variables VARIABLES according to the following partial ordering: $(X \bmod \mathtt{M}) < (Y \bmod \mathtt{M})$.

Example $(5, \langle 9, 1, 7, 6, 5\rangle, 3)$

The maximum_modulo constraint holds since its first argument MAX is set to value 5, where $5 \bmod 3 = 2$ is greater than or equal to all the expressions $9 \bmod 3 = 0$, $1 \bmod 3 = 1$, $7 \bmod 3 = 1$ and $6 \bmod 3 = 0$.

Typical

M > 1
M <maxval(VARIABLES.var)
|VARIABLES| > 1
range(VARIABLES.var) > 1

Symmetry Items of VARIABLES are permutable.

Arg. properties

Functional dependency: MAX determined by VARIABLES and M.

See also

comparison swapped: minimum_modulo.

specialisation: maximum *(*variable mod constant *replaced by* variable*)*.

Keywords

characteristic of a constraint: modulo, maximum.

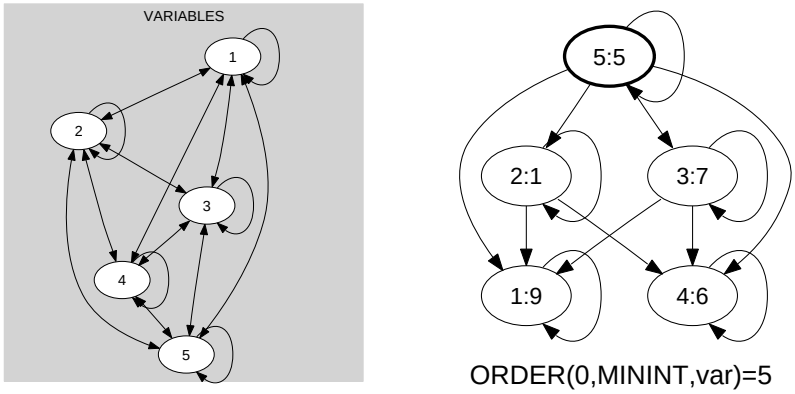
constraint arguments: pure functional dependency.

constraint type: order constraint.

modelling: functional dependency.

Arc input(s)	VARIABLES
Arc generator	$CLIQUE \mapsto$ collection(variables1, variables2)
Arc arity	2
Arc constraint(s)	$\bigvee \left(\begin{array}{l} \texttt{variables1.key} = \texttt{variables2.key}, \\ \texttt{variables1.var} \bmod \texttt{M} > \texttt{variables2.var} \bmod \texttt{M} \end{array} \right)$
Graph property(ies)	**ORDER**$(0, \texttt{MININT}, \texttt{var}) = \texttt{MAX}$

Graph model Parts (A) and (B) of Figure 5.527 respectively show the initial and final graph associated with the **Example** slot. Since we use the **ORDER** graph property, the vertex of rank 0 (without considering the loops) of the final graph is outlined with a thick circle.



(A) **(B)**

Figure 5.527: Initial and final graph of the maximum_modulo constraint