5.241 nvalues_except_0

DESCRIPTION LINKS GRAPH

Origin Derived from nvalues.

Constraint nvalues_except_0(VARIABLES, RELOP, LIMIT)

Arguments

VARIABLES	:	collection(var−dvar)
RELOP	:	atom
LIMIT	:	dvar

Restrictions

required(VARIABLES, var)
RELOP $\in [=, \neq, <, \geq, >, \leq]$

Purpose Let N be the number of distinct values, different from 0, assigned to the variables of the VARIABLES collection. Enforce condition N RELOP LIMIT to hold.

Example

$$\left\langle \begin{array}{l} \mathtt{var}-4, \\ \mathtt{var}-5, \\ \mathtt{var}-5, \\ \mathtt{var}-4, \\ \mathtt{var}-0, \\ \mathtt{var}-1 \end{array} \right\rangle, =, 3$$

The nvalues_except_0 constraint holds since the number of distinct values, different from 0, occurring within the collection $\langle 4, 5, 5, 4, 0, 1 \rangle$ is equal (i.e., RELOP is set to $=$) to its third argument LIMIT $= 3$.

Symmetries

- Items of VARIABLES are permutable.
- All occurrences of two distinct values of VARIABLES.var that are both different from 0 can be swapped; all occurrences of a value of VARIABLES.var that is different from 0 can be renamed to any unused value that is also different from 0.

Reformulation The nvalues_except_0($\langle V_1, V_2, \ldots, V_{|\mathtt{VARIABLES}|} \rangle$, RELOP , LIMIT) constraint can be expressed in term of the conjunction nvalue($NV1, \langle 0, V_1, V_2, \ldots, V_{|\mathtt{VARIABLES}|} \rangle$) $\wedge$ $NV1 - 1$ RELOP LIMIT.

Used in cycle_or_accessibility.

See also **common keyword:** assign_and_nvalues *(number of distinct values)*, nvalue, nvalues *(counting constraint,number of distinct values)*.

Keywords **characteristic of a constraint:** joker value.

constraint type: counting constraint, value partitioning constraint.

final graph structure: strongly connected component.

modelling: number of distinct values.

Arc input(s)	VARIABLES
Arc generator	$CLIQUE \mapsto$ collection(variables1, variables2)
Arc arity	2
Arc constraint(s)	• variables1.var $\neq 0$ • variables1.var = variables2.var
Graph property(ies)	**NSCC** RELOP LIMIT

Graph model Parts (A) and (B) of Figure 5.458 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NSCC** graph property we show the different strongly connected components of the final graph. Each strongly connected component corresponds to a value distinct from 0 that is assigned to some variables of the VARIABLES collection. Beside value 0, the 3 following values 1, 4 and 5 are assigned to the variables of the VARIABLES collection.

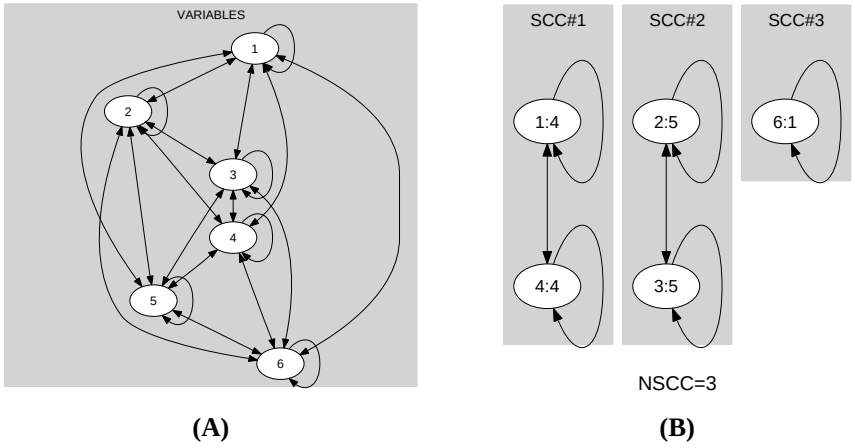

Figure 5.458: Initial and final graph of the nvalues_except_0 constraint