5.287 nvalue_on_intersection

DESCRIPTION LINKS GRAPH

Origin Derived from common and nvalue.

Constraint nvalue_on_intersection(NVAL, VARIABLES1, VARIABLES2)

Arguments

NVAL	:	dvar
VARIABLES1	:	collection(var−dvar)
VARIABLES2	:	collection(var−dvar)

Restrictions

required(VARIABLES1, var)
required(VARIABLES2, var)
NVAL ≥ 0
NVAL ≤ |VARIABLES1|
NVAL ≤ |VARIABLES2|
NVAL ≤range(VARIABLES1.var)
NVAL ≤range(VARIABLES2.var)

Purpose NVAL is the number of distinct values that both occur in the VARIABLES1 and VARIABLES2 collections.

Example $(2, \langle 1, 9, 1, 5\rangle, \langle 2, 1, 9, 9, 6, 9\rangle)$

Note that the two collections $\langle 1, 9, 1, 5\rangle$ and $\langle 2, 1, 9, 9, 6, 9\rangle$ share two values in common (i.e., values 1 and 9). Consequently the nvalue_on_intersection constraint holds since its first argument NVAL is set to 2.

Typical

NVAL > 0
NVAL < |VARIABLES1|
NVAL < |VARIABLES2|
NVAL <range(VARIABLES1.var)
NVAL <range(VARIABLES2.var)
|VARIABLES1| > 1
|VARIABLES2| > 1

Symmetries

- Arguments are permutable w.r.t. permutation (NVAL) (VARIABLES1, VARIABLES2).
- Items of VARIABLES1 are permutable.
- Items of VARIABLES2 are permutable.
- All occurrences of two distinct values in VARIABLES1.var or VARIABLES2.var can be swapped; all occurrences of a value in VARIABLES1.var or VARIABLES2.var can be renamed to any unused value.

Arg. properties

- Functional dependency: `NVAL` determined by `VARIABLES1` and `VARIABLES2`.
- Contractible wrt. `VARIABLES1` when `NVAL` $= 0$.
- Contractible wrt. `VARIABLES2` when `NVAL` $= 0$.

See also **common keyword:** `alldifferent_on_intersection`, `common`, `same_intersection` *(constraint on the intersection)*.

root concept: `nvalue`.

Keywords **constraint arguments:** pure functional dependency.

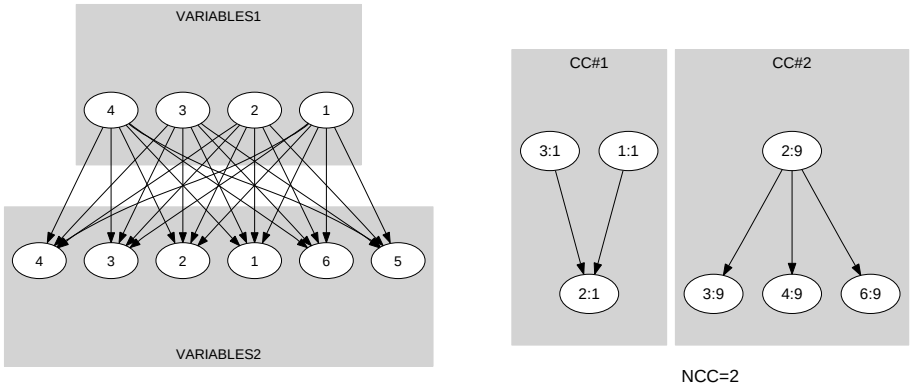
constraint type: counting constraint, constraint on the intersection.

final graph structure: connected component.

modelling: number of distinct values, functional dependency.

Arc input(s)	VARIABLES1 VARIABLES2
Arc generator	*PRODUCT* $\mapsto$ collection(variables1, variables2)
Arc arity	2
Arc constraint(s)	variables1.var = variables2.var
Graph property(ies)	**NCC** = NVAL

Graph model Parts (A) and (B) of Figure 5.601 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NCC** graph property we show the connected components of the final graph. The variable NVAL is equal to this number of connected components. Note that all the vertices corresponding to the variables that take values 5, 2 or 6 were removed from the final graph since there is no arc for which the associated equality constraint holds.



(A) **(B)**

Figure 5.601: Initial and final graph of the nvalue_on_intersection constraint