5.65 change_vectors

DESCRIPTION LINKS

Origin Derived from change

Constraint change_vectors(NCHANGE, VECTORS, CTRS)

Types

VECTOR	:	collection(var−dvar)
CTR	:	atom

Arguments

NCHANGE	:	dvar
VECTORS	:	collection(vec − VECTOR)
CTRS	:	collection(ctr − CTR)

Restrictions

$|\texttt{VECTOR}| \geq 1$
required(VECTOR, var)
$\texttt{CTR} \in [=, \neq, <, \geq, >, \leq]$
$\texttt{NCHANGE} \geq 0$
$\texttt{NCHANGE} < |\texttt{VECTORS}|$
required(VECTORS, vec)
same_size(VECTORS, vec)
required(CTRS, ctr)
$|\texttt{CTRS}| = |\texttt{VECTOR}|$

Purpose Let us note $\texttt{VECTOR}_1, \texttt{VECTOR}_2, \ldots, \texttt{VECTOR}_n$ the vectors of the VECTORS collection, and d the number of components of each vector (all vectors have the same size). NCHANGE is the number of times that the following disjunctions holds where $i \in [1, n-1]$

$(\texttt{VECTOR}_i.\texttt{vec}[1]\ \texttt{CTRS}[1]\ \texttt{VECTOR}_{i+1}.\texttt{vec}[1]) \vee$
$(\texttt{VECTOR}_i.\texttt{vec}[2]\ \texttt{CTRS}[2]\ \texttt{VECTOR}_{i+1}.\texttt{vec}[2]) \vee$
$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \vee$
$(\texttt{VECTOR}_i.\texttt{vec}[d]\ \texttt{CTRS}[d]\ \texttt{VECTOR}_{i+1}.\texttt{vec}[d])$.

Example

$$\left\langle \begin{array}{l} \texttt{vec} - \langle 4, 0\rangle, \\ \texttt{vec} - \langle 4, 0\rangle, \\ 3, \left\langle \begin{array}{l} \texttt{vec} - \langle 4, 5\rangle, \\ \texttt{vec} - \langle 3, 4\rangle, \\ \texttt{vec} - \langle 3, 4\rangle, \end{array} \right\rangle, \\ \texttt{vec} - \langle 3, 4\rangle, \\ \texttt{vec} - \langle 4, 0\rangle \\ \langle \neq, \neq \rangle \end{array} \right\rangle$$

In the example we have the following 3 changes:

- One change between $\langle 4, 0\rangle$ and $\langle 4, 5\rangle$ since $4 \neq 4 \vee 0 \neq 5$,
- One change between $\langle 4, 5\rangle$ and $\langle 3, 4\rangle$ since $4 \neq 3 \vee 5 \neq 4$,
- One change between $\langle 3, 4\rangle$ and $\langle 4, 0\rangle$ since $3 \neq 4 \vee 4 \neq 0$.

Consequently the change_vectors constraint holds since its first argument NCHANGE is assigned value 3.

Typical

CTR $\in [\neq]$
|VECTOR| > 1
NCHANGE > 0
|VECTORS| > 1

Arg. properties

Functional dependency: NCHANGE determined by VECTORS and CTRS.

See also

specialisation: change *(vector replaced by* variable*)*, change_pair *(vector replaced by* pair *of* variables*)*.

Keywords

characteristic of a constraint: automaton, automaton with counters, vector.

constraint arguments: pure functional dependency.

constraint network structure: Berge-acyclic constraint network.

modelling: number of changes, functional dependency.