5.322 period_vectors

DESCRIPTION LINKS

Origin Derived from period

Constraint period_vectors(PERIOD, VECTORS, CTRS)

Types

VECTOR	:	collection(var−dvar)
CTR	:	atom

Arguments

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

Restrictions

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

Purpose Let us note $\texttt{VECTOR}_0, \texttt{VECTOR}_1, \ldots, \texttt{VECTOR}_{n-1}$ the vectors of the VECTORS collection, and d the number of components of each vector (all vectors have the same size). PERIOD is the *period* of the sequence of vectors $\texttt{VECTOR}_0, \texttt{VECTOR}_1, \ldots, \texttt{VECTOR}_{n-1}$ according to constraints CTRS. This means that PERIOD is the smallest natural number such that $\forall i \in [0, n - \texttt{PERIOD} - 1], \forall j \in [0, d - 1] : \texttt{VECTOR}_i.\texttt{vec}[j]\ \texttt{CTRS}[j]\ \texttt{VECTOR}_{i+\texttt{PERIOD}}.\texttt{vec}[j]$.

Example

$$\left(\begin{array}{l} \texttt{vec} - \langle 1, 0\rangle, \\ \texttt{vec} - \langle 1, 5\rangle, \\ \texttt{vec} - \langle 4, 4\rangle, \\ 3, \left\langle \begin{array}{l} \texttt{vec} - \langle 1, 0\rangle, \\ \texttt{vec} - \langle 1, 5\rangle, \\ \texttt{vec} - \langle 4, 4\rangle, \end{array} \right\rangle, \\ \texttt{vec} - \langle 1, 0\rangle, \\ \texttt{vec} - \langle 1, 5\rangle \\ \langle =, = \rangle \end{array}\right)$$

The period_vectors constraint holds since its first argument PERIOD $= 3$ is equal (i.e., since CTRS is set to $\langle =, = \rangle$) to the period of the sequence $\texttt{vec} - \langle 1, 0\rangle$, $\texttt{vec} - \langle 1, 5\rangle$, $\texttt{vec} - \langle 4, 4\rangle$, $\texttt{vec} - \langle 1, 0\rangle$, $\texttt{vec} - \langle 1, 5\rangle$, $\texttt{vec} - \langle 4, 4\rangle$, $\texttt{vec} - \langle 1, 0\rangle$, $\texttt{vec} - \langle 1, 5\rangle$.

Typical

$\texttt{CTR} \in [=]$
$|\texttt{VECTOR}| > 1$
$\texttt{PERIOD} > 1$
$\texttt{PERIOD} < |\texttt{VECTORS}|$
$|\texttt{VECTORS}| > 2$

Symmetry

Items of VECTORS can be reversed.

Arg. properties

- Functional dependency: PERIOD determined by VECTORS and CTRS.
- Prefix-contractible wrt. VECTORS.
- Suffix-contractible wrt. VECTORS.

See also

specialisation: period *(vector replaced by* variable*)*.

Keywords

characteristic of a constraint: vector.

combinatorial object: periodic, sequence.

constraint arguments: pure functional dependency.

constraint type: predefined constraint.

modelling: functional dependency.