5.320 period

DESCRIPTION LINKS

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Constraint period(PERIOD, VARIABLES, CTR)

Arguments

PERIOD	:	dvar
VARIABLES	:	collection(var−dvar)
CTR	:	atom

Restrictions

PERIOD ≥ 1
PERIOD $\leq$ |VARIABLES|
required(VARIABLES, var)
CTR $\in [=, \neq, <, \geq, >, \leq]$

Purpose Let us note $V_0, V_1, \ldots, V_{m-1}$ the variables of the VARIABLES collection. PERIOD is the *period* of the sequence $V_0\ V_1 \ldots V_{m-1}$ according to constraint CTR. This means that PERIOD is the smallest natural number such that V_i CTR $V_{i+\text{PERIOD}}$ holds for all $i \in 0, 1, \ldots, m - \text{PERIOD} - 1$.

Example $(3, \langle 1, 1, 4, 1, 1, 4, 1, 1 \rangle, =)$

The period constraint holds since, as depicted by Figure 5.668, its first argument PERIOD $=$ 3 is equal (i.e., since CTR is set to $=$) to the period of the sequence 1 1 4 1 1 4 1 1.

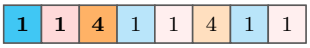

Figure 5.668: A sequence of period 3

Typical

PERIOD > 1
PERIOD $<$ |VARIABLES|
|VARIABLES| > 2
range(VARIABLES.var) > 1
CTR $\in [=]$

Symmetries

- Items of VARIABLES can be reversed.
- Items of VARIABLES can be shifted.
- All occurrences of two distinct values of VARIABLES.var can be swapped; all occurrences of a value of VARIABLES.var can be renamed to any unused value.

Arg. properties

- Functional dependency: PERIOD determined by VARIABLES and CTR.
- Contractible wrt. VARIABLES when CTR $\in [=]$ and PERIOD $= 1$.
- Prefix-contractible wrt. VARIABLES.
- Suffix-contractible wrt. VARIABLES.

Algorithm When CTR corresponds to the equality constraint, a potentially incomplete filtering algorithm based on 13 deductions rules is described in [54]. The generalisation of these rules to the case where CTR is not the equality constraint is discussed.

See also **generalisation:** period_vectors *(*variable *replaced by vector).*

implies: period_except_0.

soft variant: period_except_0 *(value* 0 *can match any other value).*

Keywords **combinatorial object:** periodic, sequence.

constraint arguments: pure functional dependency.

constraint type: predefined constraint, timetabling constraint, scheduling constraint.

filtering: border.

modelling: functional dependency.