5.178 in_interval

DESCRIPTION LINKS GRAPH AUTOMATON

Origin Domain definition.

Constraint in_interval(VAR, LOW, UP)

Synonyms dom, in.

Arguments

VAR	:	dvar
LOW	:	int
UP	:	int

Restriction LOW ≤ UP

Purpose Enforce the domain variable VAR to take a value within the interval [LOW, UP].

Example $(3, 2, 5)$

The in_interval constraint holds since its first argument VAR $= 3$ is greater than or equal to its second argument LOW $= 2$ and less than or equal to its third argument UP $= 5$.

Typical

LOW < UP
VAR > LOW
VAR < UP

Symmetries

- LOW can be decreased.
- UP can be increased.
- An occurrence of a value of VAR can be replaced by any other value in [LOW, UP].
- One and the same constant can be added to VAR, LOW and UP.

Remark Entailment occurs immediately after posting this constraint.

The in_interval constraint is referenced under the name dom in **Gecode**.

Systems member in **Choco**, domin **Gecode**, in in **JaCoP**, in in **SICStus**.

See also **common keyword:** domain, in *(domain definition)*.

generalisation: in_interval_reified *(reified version)*, in_intervals *(single interval replaced by a set of intervals)*, in_set *(interval replaced by set variable)*.

Keywords **characteristic of a constraint:** automaton, automaton without counters, reified automaton constraint, derived collection.

constraint arguments: unary constraint.

constraint network structure: Berge-acyclic constraint network.

constraint type: value constraint.

filtering: arc-consistency.

modelling: interval, domain definition.

Derived Collections

col(VARIABLE−collection(var−dvar), [item(var − VAR)])
col(INTERVAL−collection(low−int, up−int), [item(low − LOW, up − UP)])

Arc input(s)	VARIABLE INTERVAL
Arc generator	*PRODUCT* ↦ collection(variable, interval)
Arc arity	2
Arc constraint(s)	• variable.var ≥ interval.low • variable.var ≤ interval.up
Graph property(ies)	**NARC**= 1

Graph model Parts (A) and (B) of Figure 5.401 respectively show the initial and final graph associated with the **Example** slot. Since we use the **NARC** graph property, the unique arc of the final graph is stressed in bold.

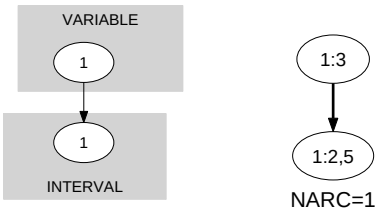

Figure 5.401: Initial and final graph of the in_interval constraint

Automaton

Figure 5.402 depicts the automaton associated with the `in_interval` constraint. We have a single 0-1 signature variable S as well as the following signature constraint: $\texttt{VAR} \geq \texttt{LOW} \wedge \texttt{VAR} \leq \texttt{UP} \Leftrightarrow S$.

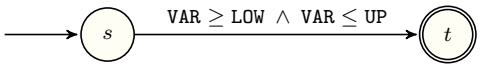

Figure 5.402: Automaton of the `in_interval` constraint

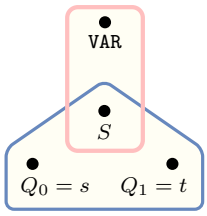

Figure 5.403: Hypergraph of the reformulation corresponding to the automaton of the `in_interval` constraint