5.70 clause_or

DESCRIPTION LINKS AUTOMATON

Origin

Logic

Constraint

`clause_or`(`POSVARS`, `NEGVARS`, `VAR`)

Synonym

`clause`.

Arguments

`POSVARS`	:	`collection`(`var`−`dvar`)
`NEGVARS`	:	`collection`(`var`−`dvar`)
`VAR`	:	`dvar`

Restrictions

$|\texttt{POSVARS}| + |\texttt{NEGVARS}| > 0$
`required`(`POSVARS`, `var`)
$\texttt{POSVARS.var} \geq 0$
$\texttt{POSVARS.var} \leq 1$
`required`(`NEGVARS`, `var`)
$\texttt{NEGVARS.var} \geq 0$
$\texttt{NEGVARS.var} \leq 1$
$\texttt{VAR} \geq 0$
$\texttt{VAR} \leq 1$

Purpose

Given a first collection of 0-1 variables $\texttt{POSVARS} = U_1, U_2, \ldots, U_p$, a second collection of 0-1 variables $\texttt{NEGVARS} = V_1, V_2, \ldots, V_n$, and a variable `VAR`, enforce $\texttt{VAR} = (U_1 \vee U_2 \vee \cdots \vee U_p) \vee (\neg V_1 \vee \neg V_2 \vee \cdots \vee \neg V_n)$.

Example

$(\langle 0, 0\rangle, \langle 0\rangle, 1)$

Typical

$|\texttt{POSVARS}| + |\texttt{NEGVARS}| > 1$

Symmetries

- Items of `POSVARS` are permutable.
- Items of `NEGVARS` are permutable.

Arg. properties

- Extensible wrt. `POSVARS` when $\texttt{VAR} = 1$.
- Extensible wrt. `NEGVARS` when $\texttt{VAR} = 1$.

Remark

The `clause_or` constraint is called `clause` in **Gecode** (http://www.gecode.org/).

Systems

reifiedOr in **Choco**, clause in **Choco**, clause in **Gecode**.

See also

common keyword: `clause_and`, `or` (*Boolean constraint*).

Keywords

characteristic of a constraint: automaton, automaton without counters, reified automaton constraint.

constraint network structure: Berge-acyclic constraint network.

constraint type: Boolean constraint.

filtering: arc-consistency.

modelling: disjunction.

Automaton Figure 5.173 depicts the automaton associated with the clause_or constraint:

- To the argument VAR of the clause_or constraint corresponds the first signature variable.
- To each variable of the argument POSVARS corresponds a signature variable.
- Finally, to each variable $\mathtt{VAR}_i$ of the argument NEGVARS corresponds a signature variable that is the negation of $\mathtt{VAR}_i$.

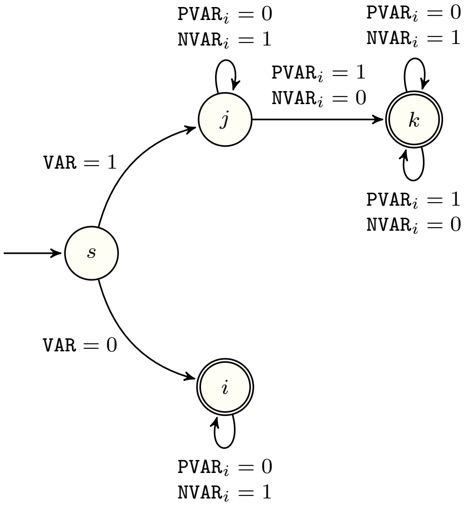

Figure 5.173: Automaton of the clause_or constraint ($\mathtt{PVAR}_i$ and $\mathtt{NVAR}_i$ respectively denote variables of POSVARS and NEGVARS)

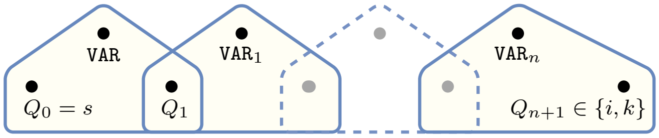

Figure 5.174: Hypergraph of the reformulation corresponding to the automaton of the clause_or constraint ($\mathtt{VAR}_1, \ldots, \mathtt{VAR}_n$ denotes $\mathtt{PVAR}_1, \ldots, \mathtt{PVAR}_{|\mathtt{POSVARS}|}, 1 - \mathtt{NVAR}_1, \ldots, 1 - \mathtt{NVAR}_{|\mathtt{NEGVARS}|}$)