CONSTRAINT PROGRAMMING & PLANNING

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SMODELS: ABSTRACT VIEW

- Prima di tutto si fa il grounding
- Poi si fanno le possibili attività polinomiali (modello well founded)
- A questo punto parte la computazione non deterministica
- Vediamo una descrizione ad alto livello dovuta a Yuliya Lierler (Univ. Nebraska at Omaha):

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For a set σ of atoms, a *record* relative to σ is an ordered set M of literals over σ, some possibly annotated by Δ, which marks them as *decision* literals. A *state* relative to σ is a record relative to σ possibly preceding symbol $\perp$. For instance, some states relative to a singleton set $\{a\}$ of atoms are

$$\emptyset,\quad a,\quad \neg a,\quad a^{\Delta},\quad a\ \neg a,\quad \perp,\quad a\perp,\quad \neg a\perp,\quad a^{\Delta}\perp,\quad a\ \neg a\perp.$$

We say that a state is inconsistent if either $\perp$ or two complementary literals occur in it. For example, states $a\ \neg a$ and $a\perp$ are inconsistent.

By $Bodies(\Pi, a)$ we denote the set of the bodies of all rules of a regular program Π with the head a. We recall that a set U of atoms occurring in a regular program Π is *unfounded* [18, 19] on a consistent set M of literals with respect to Π if for every $a \in U$ and every $B \in Bodies(\Pi, a)$, $M \models \overline{B}$ (where B is identified with the conjunction of its elements), or $U \cap B^{pos} \neq \emptyset$.

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For a set σ of atoms, a *record* relative to σ is an ordered set M of literals over σ, some possibly annotated by Δ, which marks them as *decision* literals. A *state* relative to σ is a record relative to σ possibly preceding symbol $\bot$. For instance, some states relative to a singleton set $\{a\}$ of atoms are

$$\emptyset,\quad a,\quad \neg a,\quad a^{\Delta},\quad a\ \neg a,\quad \bot,\quad a\bot,\quad \neg a\bot,\quad a^{\Delta}\bot,\quad a\ \neg a\bot.$$

We say that a state is inconsistent if either $\bot$ or two complementary literals occur in it. For example, states $a\ \neg a$ and $a\bot$ are inconsistent.

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Unit Propagate:

$M \Longrightarrow M\ l$ if $\quad C \vee l \in \Pi^{cl}$ and $\overline{C} \subseteq M$

Decide:

$M \Longrightarrow M\ l^{\Delta}$ if $\quad l$ is unassigned by M

Fail:

$$M \Longrightarrow \perp \text{ if } \begin{cases} M \text{ is inconsistent and different from } \perp, \\ M \text{ contains no decision literals} \end{cases}$$

Backtrack:

$$P\ l^{\Delta}\ Q \Longrightarrow P\ \bar{l} \text{ if } \begin{cases} P\ l^{\Delta}\ Q \text{ is inconsistent, and} \\ Q \text{ contains no decision literals} \end{cases}$$

Unfounded:

$M \Longrightarrow M\ \neg a$ if $a \in U$ for a set U unfounded on M w.r.t. Π