Session 5

- θ-subsumption
- Least General Generalization (LGG)
- Relative LGG (RLGG)
- Inverse resolution

θ-subsumption

- Intuition:
  $c_1 \leq_\theta c_2$ if c_2 is a "special case" of c_1

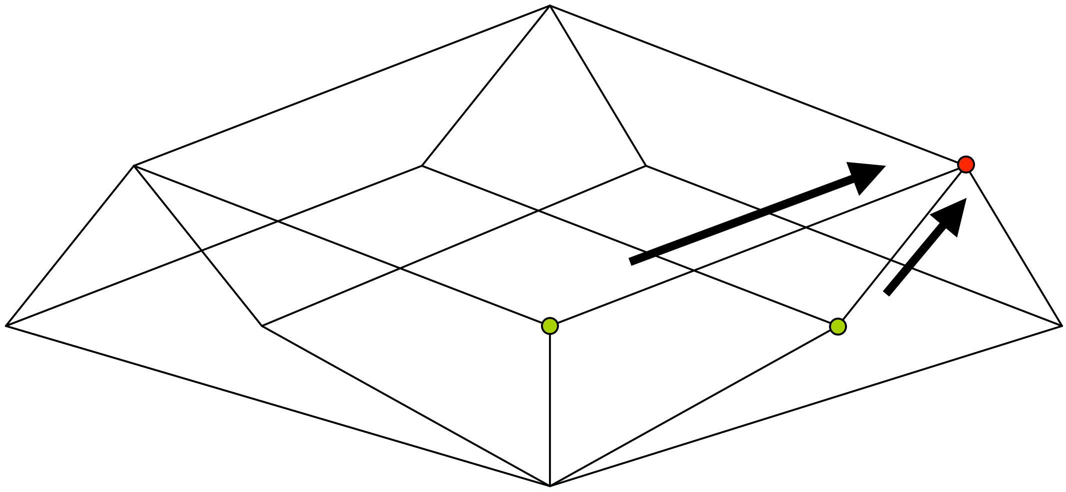
- Defines generality (partial order) for First Order clauses
- Variable substitution θ :
  - changing variable into other variable or constant

    e.g., q = {X/a, Y/b}
- θ-subsumption
  - $c_1 \leq_\theta c_2 \Leftrightarrow \exists\theta: c_1\theta \subseteq c_2$

  - first write clauses as disjunctions

  $a,b \leftarrow d,e,f \quad <=> \quad a \vee b \vee \neg d \vee \neg e \vee \neg f$

(Relative) Least General Generalization



- lgg of terms:
  - $lgg(f(s_1,\ldots,s_n), f(t_1,\ldots,t_n)) = f(lgg(s_1,t_1),\ldots,lgg(s_n,t_n))$
  - $lgg(f(s_1,\ldots,s_n),g(t_1,\ldots,t_n)) = Var$
- lgg of literals:
  - $lgg(p(s_1,\ldots,s_n),p(t_1,\ldots,t_n)) = p(lgg(s_1,t_1), \ldots, lgg(s_n,t_n))$
  - $lgg(\neg p(s_1,\ldots,s_n), \neg p(t_1,\ldots,t_n)) = \neg p(lgg(s_1,t_1), \ldots, lgg(s_n,t_n))$
  - $lgg(p(s_1,\ldots,s_n),q(t_1,\ldots,t_m))$ is undefined
  - $lgg(p(\ldots), \neg p(\ldots))$ and $lgg(\neg p(\ldots),p(\ldots))$ are undefined
- lgg of clauses:
  - $lgg(c_1,c_2) = \{lgg(l_1, l_2) \mid l_1 \in c_1, l_2 \in c_2$ and $lgg(l_1,l_2)$ defined$\}$

- $rlgg(e_1,e_2) = lgg(e_1 :\!- B, e_2 :\!- B) - \neg B$

Inverse Resolution

- Absorption

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p:-q,B      q:-A

      p:-A,B
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- Identification

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p:-q,B      q:-A

      p:-A,B
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- Intra-construction

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q:-B    p:-A,q    q:-C

   p:-A,B   p:-A,C
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- Inter-construction

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p:-r,B   r:-A    q:-r,C

   p:-A,B   q:-A,C
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