



Introduction to Logic

Herbrand Resolution

Problem With Natural Deduction

Assumption

$$\begin{aligned} &p(a) \\ &p(f(a)) \\ &p(x) \Rightarrow q(x) \\ &\sim p(x) \Rightarrow q(x) \end{aligned}$$

Universal Elimination

$$\begin{array}{cc} \forall x. \forall y. q(x, y) & \\ q(a, a) & q(x, a) \\ q(a, y) & q(x, y) \\ q(a, f(a)) & q(x, f(a)) \\ \dots & \dots \end{array}$$

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Resolution Principle

The *Resolution Principle* is a rule of inference.

Using the Resolution Principle alone (without axiom schemata or other rules of inference), it is possible to build a proof system (called *Resolution*) that is can prove everything that can be proved in Fitch.

The search space using the Resolution Principle is much smaller than that of natural deduction systems.

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Programme

Clausal Form

Unification

Resolution Rule of Inference

Unsatisfiability

Logical Entailment

Answer Extraction

