Predicate logic: Undecidability

CS242 Formal Specification and Verification

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Soundness, completeness and undecidability

Predicate logic is sound and complete:
$\phi_1, \phi_2, \ldots, \phi_n \vdash \psi$ iff $\phi_1, \phi_2, \ldots, \phi_n \models \psi$.

Checking whether ϕ is valid (i.e. $\models \phi$) is undecidable.

Corollaries:

- Checking whether ϕ is satisfiable is undecidable.
- Checking whether ϕ is provable (i.e. $\vdash \phi$) is undecidable.