Implicit Quantification

Predicate logic

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Example

The sum of even integers is even.

- Are there any quantifiers here?

Symbolic form

The sum of even integers is even.

- Even integers, $2x$ for $x \in \mathbb{F}$
- Sum $2x + 2y = 2z$ for $x, y, z \in \mathbb{F}$
- Quantification
  - any x, y
  - We can find some z

Implicit quantificitation.

The sum of even integers is even.

$$\forall x \in \mathbb{F},\ \forall y \in \mathbb{F},\ \exists y \in \mathbb{F},\ 2x + 2y = 2z. \qquad (1)$$

Summary

Implicit quantification is common.

- Over-explicit statements are clumsy and hard to read
- Rely on context
- Used wisely, implicit quantification is unambiguous
  - not sloppy
  - easier to read

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Exercise

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Are there any implicit quantifiers in the statement, the product of odd integers is odd?