

1 Entailment & Deduction

Give formulas of first-order predicate logic that represent the truth conditions of the following sentences as closely as possible. “in LST” can be treated as a single one-place predicate. Use (i) the resolution method and (ii) semantic tableaux to show that the (b) sentences follow from the (a) sentences.

- (a) Bill got a degree in LST.
(b) Bill got a degree.
- (a) Bill didn't get a degree.
(b) Bill didn't get a degree in LST.

2 Resolution

Use the resolution procedure to determine whether (a) entails (b) or not.

- $\exists x(Q(x) \wedge \neg \exists A(x, y))$
- $\neg \exists y \forall x(Q(x) \rightarrow A(x, y))$

3 Semantic Tableaux

Use semantic tableaux to determine whether (a) entails (b) or not. If entailment does not hold, give a countermodel in which the premises are true and the conclusion is false.

- $\exists x \forall y R(x, y)$
- $\forall x R(x, x)$

To be turned in by Thursday, 2009-05-14, 10:00