

Science of Computational Logic

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Problem 6.1

Judge the following propositions and prove them according to your judgement.

1. There is equational theory E such that the two substitutions $\theta = \{X \mapsto a, Y \mapsto b\}$ and $\eta = \{X \mapsto b, Y \mapsto a\}$ are E -equal.
2. There is an equational theory E such that the two substitutions $\theta = \{X \mapsto a, Y \mapsto b\}$ and $\eta = \{X \mapsto b, Y \mapsto a\}$ are *not* E -equal.
3. The following two substitutions $\theta = \{X \mapsto a\}$, $\eta = \{X \mapsto b\}$ E -equal, if $E = \{a \approx b\}$.
4. The following two substitutions $\theta = \{X \mapsto f(f(a, a), a)\}$, $\eta = \{X \mapsto f(a, f(a, a))\}$ E -equal, if E is the associative theory.

Problem 6.2

Prove the following statements:

1. Show that commutativity is not unitary.
2. Show that associativity is infinitary.

Problem 6.3

Describe a E-Unification procedure for commutative theories.