Assignment 3

Foundations of Logic Programming

November 9, 2012

- 1. Prove Idempotence Lemma: A substitution θ is idempotent iff $Dom(\theta) \cap VRan(\theta) = \emptyset$ where $VRan(\theta)$ is the set of variables in the range of θ .
- 2. Prove that the set of idempotent substitutions is not closed under composition.
- 3. Suppose that θ and η are idempotent substitutions such that $Dom(\theta) \cap VRan(\eta) = \emptyset$. Prove that $\theta\eta$ is idempotent.
- 4. θ is a strong mgu if for all unifiers η , $\eta = \theta \eta$. Prove that θ is a strong mgu iff θ is an idempotent mgu.
- 5. Prove Equivalence Lemma: Let θ_1 be an mgu of a set of equations E. Then for every substitution θ_2 , θ_2 is an mgu of E iff $\theta_2 = \theta_1 \gamma$ for a renaming γ .
- 6. The concept of a unifier generalizes in an obvious way to finite sets of terms. Let \mathcal{T} be a finite set of terms. Prove that there exists a pair of terms s, t such that for all substitutions θ , we have θ is a unifier of \mathcal{T} iff θ is a unifier of s and t.