Information Sciences

A polynomial Time Subsumption Algorithm for Nominal Safe ELO⊥ under Rational Closure

Giovanni Casini, Umberto Straccia, Thomas Meyer

Abstract
Description Logics (DLs) under Rational Closure (RC) is a well-known framework for nonmonotonic reasoning in DLs. In this paper, we address the concept subsumption decision problem under RC for nominal safe ELO⊥, a notable and practically important DL representative of the OWL 2 profile OWL 2 EL. Our contribution here is to define a polynomial time subsumption procedure for nominal safe ELO⊥ under RC that relies entirely on a series of classical, monotonic EL⊥ subsumption tests. Therefore, any existing classical monotonic EL⊥ reasoner can be used as a black box to implement our method. We then also adapt the method to one of the known extensions of RC for DLs, namely Defeasible Inheritance-based DLs without losing the computational tractability.