From Classical to Consistent Query Answering under Existential Rules

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Abstract

We consider the well-known setting of ontology-based query answering. In real-life applications, involving large amount of data, it is possible that the data are inconsistent with the ontology. Since standard ontology languages adhere to the classical first-order logic semantics, inconsistencies are nothing else than logical contradictions. Therefore, the classical inference semantics fails terribly when faced an inconsistency, since everything is inferred from a contradiction. Querying inconsistent knowledge bases is an intriguing new problem that gave rise to a flourishing research activity in the KR community. In this talk, we focus on rule-based ontology languages, and we demonstrate the tight connection between classical and consistent query answering. More precisely, we focus on the standard inconsistency-tolerant semantics, namely, the ABox repair (AR) semantics, and we establish generic complexity results that allow us to obtain in a uniform way a relatively complete picture of the complexity of our problem. We also discuss sound approximations of the AR semantics, with the aim of achieving tractability of consistent query answering in data complexity.