On the expressive limits of reified theories

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Abstract
Reified theories have been used widely in knowledge representation. From an ontological perspective, reification involve populating the ontology with event or property types and tokens. While type reification has been used in many works, it has been criticized as being philosophically unsound, and token reification has been advocated in its place by Galton. In this paper, we take the position of an axiomatizer, and examine the limitations of both token and type reifications. We discover that neither type nor token reification suffices for the work of an axiomatizer – while we note type reification’s inability to represent the causality relations among events without using the more generalized case of causality relations among event types, token reification also fails to represent the simple notion of the trial of an event or action, which is clearly different from an actual occurrence of the event or action. Consequently, we propose a theory that unifies both token and type reification. While our theory includes types and tokens in its ontology, it achieves this feat by the use of type and token variables in a way similar to Davidson so that syntactically, a formula is not given the status of a term, thus achieving some sort of syntactic unreification. We also introduce functions to our theory that enable us to represent complex events without populating the ontology further. Repetitive events are also elegantly represented without inventing new predicates or enriching the ontology further. The relationship between tokens and types in our theory is discussed and concretized in a number of theorems.