Axiomatizing hybrid XPath with data. (English) Zbl 07407777

Summary: In this paper we introduce sound and strongly complete axiomatizations for XPath with data constraints extended with hybrid operators. First, we present HXPath, a multi-modal version of XPath with data, extended with nominals and the hybrid operator @. Then, we introduce an axiomatic system for HXPath, and we prove it is strongly complete with respect to the class of abstract data models, i.e., data models in which data values are abstracted as equivalence relations. We prove a general completeness result similar to the one presented in, e.g., [P. Blackburn and B. ten Cate, Stud. Log. 84, No. 2, 277–322 (2006; Zbl 1115.03009)], that ensures that certain extensions of the axiomatic system we introduce are also complete. The axiomatic systems that can be obtained in this way cover a large family of hybrid XPath languages over different classes of frames, for which we present concrete examples. In addition, we investigate axiomatizations over the class of tree models, structures widely used in practice. We show that a strongly complete, finitary, first-order axiomatization of hybrid XPath over trees does not exist, and we propose two alternatives to deal with this issue. We finally introduce filtrations to investigate the status of decidability of the satisfiability problem for these languages.

MSC:

03B70 Logic in computer science
68-XX Computer science

Keywords:
XPath; data graphs; axiomatizations; data trees; decidability

Software:
XPath; XQuery

Full Text: Link arXiv

References: