Preface

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This special issue of the Semantic Web journal contains thoroughly revised and significantly extended versions of selected papers presented at the Fourth International Conference on Web Reasoning and Rule Systems (RR 2010), which was held in Bressanone/Brixen, Italy, September 22–24, 2010.

The Semantic Web aims at allowing knowledge to be freely accessed and exchanged by software. It is now widely recognized that if the Semantic Web is to contain deep knowledge, the need for new representation and reasoning techniques is going to be critical. These techniques need to find the right trade-off between expressiveness, scalability, and robustness to deal with the inherently incomplete, contradictory, and uncertain nature of knowledge on the Web.

The annual *International Conference on Web Reasoning and Rule Systems (RR)* is addressing these needs and has grown into a major international forum for the discussion and dissemination of new results concerning Web Reasoning and Rule Systems. The first three International Conferences on Web Reasoning and Rule Systems (see http://www.rr-conference.org), held in Innsbruck, Austria (2007), Karlsruhe, Germany (2008), and Chantilly, Virginia, USA (2009), received enthusiastic support from the Web Reasoning community.

There were 15 (full or short) technical papers at RR 2010, which had been selected out of 31 submitted papers in a rigorous reviewing process, where each paper had been reviewed by at least three program committee members. After the conference, the authors of five papers judged best were invited to prepare thoroughly revised and significantly extended versions of their conference contributions to be considered for publication in the Semantic Web journal. Based on a rigorous reviewing process, the three papers listed below have been selected for this special issue.

- In *Complexity of Redundancy Detection on RDF Graphs in the Presence of Rules, Constraints, and Queries*, Reinhard Pichler, Axel Polleres, Sebastian Skritek, and Stefan Woltran study the problem of redundancy detection on RDF graphs in the presence of rules and constraints, and with respect to queries. They investigate the influence of several problem parameters on the complexity of detecting redundancy. The main result of the paper is a fine-grained complexity analysis of both graph and rule minimization in various settings.
- In *Paraconsistent OWL and Related Logics*, Frederick Maier, Yue Ma, and Pascal Hitzler propose four-valued paraconsistent description logics, which can reason over inconsistencies. They focus on logics corresponding to OWL DL and its profiles. They present the logic $\mathcal{SROIQ}4$, which is sound relative to classical $\mathcal{SROIQ}$ and has a consequence-preserving embedding into $\mathcal{SROIQ}$. They also examine paraconsistent variants of $\mathcal{EL}^{++}$, *DL-Lite*, and Horn-DLs.
- In *Model Outlines: A Visual Language for DL Concept Descriptions*, Fernando Náufel do Amaral proposes a new visualization framework called "model outlines", where more emphasis is placed on the semantics of concept descriptions than on their syntax. He presents detailed algorithms for translating between model outlines and the description logic $\mathcal{ALCN}$. He also reports on the results of a recent usability study comparing model outlines and Manchester OWL.

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