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Partial Evaluation of Order-sorted Equational Programs modulo Axioms ⋆

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Abstract. Partial evaluation (PE) is a powerful and general program optimization technique with many successful applications. However, it has never been investigated in the context of expressive rule-based languages like Maude, CafeOBJ, OBJ, ASF+SDF, and ELAN, which support: rich type structures with sorts, subsorts and overloading; and equational rewriting modulo axioms such as commutativity, associativity–commutativity, and associativity–commutativity–identity. In this paper, we illustrate the key concepts by showing how they apply to partial evaluation of expressive rule-based programs written in Maude. Our partial evaluation scheme is based on an automatic unfolding algorithm that computes term *variants* and relies on *equational least general generalization* for ensuring global termination. We demonstrate the use of the resulting partial evaluator for program optimization on several examples where it shows significant speed-ups.

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