The System SOL version 2025

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SOL is a Haskell-based tool for showing confluence and strong normalisation of higher-order computation. SOL is intended to be a generic higher-order computation analysis tool that is applicable to the modern theories of higher-order programming languages. This aim is demonstrated in [Ham19] and further developed in [HAK20].

Based on the foundation of second-order algebraic theories [FH10] and its computational counter part [Ham19] and polymorphic extension [HAK20], we have implemented various results on higher-order syntax and computation in SOL, including Knuth and Bendix's critical pair checking for confluence.

Recently, Muroya and Hamana have proposed a framework referred to as Term Evaluation Systems (TERS), unifying operational semantics and refinement reasoning [MH24]. We have also implemented contextual improvement verification by critical pair analysis [MH24] in SOL. Since every context-sensitive rewriting system can be simulated by a nondeterministic term evaluation system, in the present SOL 2025 version, we have implemented confluence checking of context-sensitive rewriting on an experimental basis.

References

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