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A Theory of Weak Bisimulation for Core CML*

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Abstract

Concurrent ML is an extension of Standard ML of New Jersey with concurrent features similar to those of process algebra. Reppy has given it an operational semantics based on reductions of configurations, using entire programs rather than program fragments. The existing semantics are not, therefore compositional, and do not support compositional reasoning (for example equational reasoning about program fragments). We present a compositional operational semantics for a fragment of CML, based on higher-order process algebra, and use this to define weak bisimulation for CML. We give some small examples of proofs about CML expressions and show that our semantics corresponds to Reppy's up to weak first-order bisimulation.