Integration of Fourier-Motzkin based Variable-Elimination into iSAT[1]

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Over the past decades the complexity of embedded systems increased dramatically. Today, embedded systems often contain analog parts in addition to their digital components – making them to embedded hybrid systems. Especially in safety critical environments like automotive or avionics applications it is desired to be able to prove the correctness of such hybrid systems.

SMT-Solvers are able to handle boolean combinations of linear and non-linear arithmetic constraints and thus are a natural choice to verify safety properties of systems with hybrid discrete-continous behaviour. The SMT-Solver iSAT additionally provides support for transcendental functions like sine or cosine. Furthermore iSAT tightly integrates interval-based arithmetic reasoning into the CDCL framework used by most modern SAT-Solvers. But because of the use of interval-arithmetic, iSAT may not always be able to give a conclusive result.

The talk addresses this problem and presents the integration of a variable elimination technique based on Fourier-Motzkin into iSAT.

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