Using an Automated Theorem Prover to Support First Order Relativity Theory

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Abstract

We discuss our recent attempts with Németi et al. to machine-verify proofs in first-order relativity theory using the Isabelle/HOL automated proof assistant [SN14].[1] We show in detail how a common background context for SpecRel/AccRel/GenRel can be defined, and how theorems in these logics can both be expressed and proven using the system. Our investigation to date has focussed on SpecRel, and suggests that the development of an Isabelle/HOL library may prove invaluable for researchers in the field. But considerable further development is required if certain, considerably more far-reaching, results in GenRel are to be verified.

A live practical demonstration of the steps involved in using Isabelle/HOL to prove SpecRel theorems will be included.

References

[SN14] Mike Stannett and István Németi. Using Isabelle/HOL to Verify First-Order Relativity Theory. *Journal of Automated Reasoning*, 52(4):361–378, 2014.

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