

A Certified Proof of the Cartan Fixed Point Theorems

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Abstract In this paper we present a machine-certified proof for the Cartan Fixed Point Theorems in the univariate case, using the HOL Light theorem prover.

Keywords Formal proving · Complex analysis · Cartan fixed point theorems

1 Introduction

The interest of the authors for the research in *formal theorem proving* can be traced back to their studies of the techniques of symbolic computation applied to research in algebraic and complex geometry. The recent achievements in the subject convinced the authors that the methods of formal proving should eventually become one of the tools available to any professional mathematician.

We understand that at the moment, the majority of mathematicians feel that the *formal* approach is too distant from their current research field. Moreover, it is a common feeling that any kind of computer-assisted theorem proving will only work at a very basic mathematical level and will not be suitable to reach any recent result which is either interesting, or deep, or both.

The present paper is aimed to help bridge the gap between current edge mathematical research and formal theorem proving methods. To this aim, we present here a meaningful and enlightening example, by providing, and discussing, the formal proofs of two theorems due to Henri Cartan. These theorems are well-known, relatively recent and of fundamental importance in complex analysis and related fields

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