

# Proof Simplification in Automated Theorem Proving

**Michael Kinyon**<sup>1,2,3</sup>

<sup>1</sup> University of Denver

<sup>2</sup> Center for Mathematics and its Applications, NOVA University of Lisbon

<sup>3</sup> Universidade Aberta

When an automated theorem prover such as Prover9 finds a proof of a theorem, it rarely finds an optimal proof by any standard of optimality. For example, the search for the proof might have taken a long time so that the search space is quite large; when this happens, derivations of some clauses that are used in the proof may be unnecessarily large. Fortunately, once a first proof is found, there are some techniques one may use to coax Prover9 into finding a simpler proof. However, this leads to an obvious question: what exactly makes one proof “simpler” than another? In this talk I will discuss some reasonable criteria for measuring the simplicity of a proof given by an automated theorem prover. I will also discuss some of the aforementioned simplification techniques.