

UNIVERSITY OF SOUTH FLORIDA

Defense of Master's Thesis

A Flexible, Natural Deduction, Automated Reasoner for Quick
Deployment of Non-Classical Logic

by
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For the MSCP degree in Computer Science & Engineering

Automated Theorem Provers (ATP) are software programs which carry out inferences over logico-mathematical systems, often with the goal of finding proofs to some given theorem. ATP systems are enormously powerful programs, capable of solving immensely difficult problems. Currently, many automated theorem provers exist like SPASS, ACL2, Coq etc. However, all the available theorem provers have some common problems: (1) Current ATPs tend not to try to find proofs entirely on their own. They need help from human experts to supply lemmas, proof, etc. (2) There is not a single proof system available which provides fully automated platforms for both First Order Logic (FOL) and other Higher Order Logic (HOL). (3) Finally, current proof systems do not have an easy way to quickly deploy and reason over new logical systems which a logic researcher may want to test. In response to these problems, I introduce the MATR framework. MATR is a platform-independent, codelet-based (independent operating processes) proof system with an easy-to-use Graphical User Interface (GUI), where multiple codelets are selected based on the formal system desired. MATR provides a platform for different proof strategies like forward and backward reasoning, along with different formal systems such as nonclassical logics. It enables users to create their own proof system by selecting from the list of codelets without needing to write an ATP from scratch.

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2:00 PM

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