

## **Abstract**

Requirement-based automated test case generation has been advocated as a model-based technique for generating a test suite related to individual requirements. The method proposed in this thesis consists in an approach of automating the generation of requirement-based test suites from requirements modeled by an Extended Finite State Machine (EFSM) and using EFSM Dependence Analysis. Two types of dependencies are identified between elements of the EFSM model and used to identify interactions among these elements. Patterns of interactions that affect a requirement under test are then developed to generate a test suite related to this requirement.

This thesis proposes algorithms to identify data and control dependencies in the EFSM model, algorithms to use EFSM dependencies in the generation of patterns of interactions related to a requirement under test and algorithms to derive a test suite related to these patterns of interactions. Also, a *Test Suite Generation* program (TSG) has been developed based on these algorithms and case studies have been performed to confirm the generation of efficient test suites for individual requirements.