**Assessing and Improving Software Testing Practices of Large Scale Scientific Simulation Software**

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**Summary**

Large scale scientific simulation software plays an important role in scientific discovery. Thus it is important to verify that they are free of software faults. Testing these programs is hard due to their complexity and the oracle problem. This study proposes to

1. Investigate the current testing practices used to address the oracle problem for large scale scientific simulation software and measure their effectiveness.
2. Improve/complement current testing practices through metamorphic testing to address the oracle problem.
3. Implement tool support to integrate metamorphic testing to the software development process.

**Preliminary study plan**

1. Identify two suitable scientific simulations.
2. Evaluate the effectiveness of current tests using mutants.
3. Derive function level and system level metamorphic relations for the programs.
4. Conduct MT and evaluate the effectiveness using the same set of mutants.
5. Also compare the testing cost perhaps in terms of the test execution time.

Comments:

1. How do we show the novelty of our work?