2008 EARTHQUAKE SIMULATORS WORKSHOP REPORT

Workshop on Earthquake Simulators, Number 2

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SUMMARY

This was a workshop to bring together those in the SCEC community who are working on various types of computer simulators of earthquake sequences. The principal purposes of the workshop were to allow the participants 1) to compare the results from the first two simple problems we devised during the past year: (a) a test that the stresses computed by each simulator matched those from the Okada solutions and (b) a simple strike-slip fault problem, 2) to define the next generation of tests for our comparison exercises, 3) to determine what kinds of tests could be done for validation and verification of our results, and 4) to determine what additional sources of funds might exist for supporting simulator research and discuss if any interactions with other groups such as CIG, might make sense.

AGENDA

SCEC Earthquake Simulators Workshop 2

June 9, 2008

Embassy Suites Mandalay Beach Resort, Oxnard, CA

7:30   Breakfast

Morning Session – Problems Worked on and to be Worked on
8:30   Welcome and Intro: Purpose of Second Workshop – Terry Tullis
8:35   Compare Results from Problems 1 and 2 – Keith Richards-Dinger
             Problem 1 – Simple Comparison with Okada Solutions
             Problem 2 – Simple Strike-slip Fault
10:00 Coffee Break
10:30 Define Next Problems to Work on
             Dipping Fault?
             Multiple Faults?

12:00 Lunch

Afternoon session – Issues Related to Moving Forward with a Larger Program
1:30   Community Views Toward Simulations of Earthquakes and of Catalogs
2:30   What Types of Validations are Possible?
             Other Static or Quasi-static Simulations
             Dynamic Simulations
             Earthquake Catalog Data
             Other Earthquake Data

3:00   Coffee Break
3:30   Funding Opportunities
4:30   CIG Interactions and Workshop
4:45   Wrap-up Discussion
5:00   Workshop End
6:30   Dinner

OVERVIEW

This was a by-invitation workshop. As stated in the proposal for this workshop:

"Clearly one of the biggest tasks facing the simulator community is to determine how meaningful are their simulations. Much of the discussion in the workshop will center around this question and the best ways to evaluate the simulators. Comparisons between different simulators and between the simulators and earthquake data sets will be central to this discussion. It is important to gain an understanding of the role played by different assumptions concerning friction, fault geometry, elastodynamics, boundary conditions, element size and number as well as the role played by different computational approaches. The group at the workshop will have to make decisions about the most productive way to approach all of these issues if the project is to move forward. At this stage it is premature to speculate about the nature of the problems that may be posed for the group to work on following the workshop. Determining how successful the effort to date has been and what should be done next are the reasons for having it."

VENUE AND ATTENDEES

The meeting was held at the Embassy Suites Mandalay Beach Resort, Oxnard, CA. Those invitees in attendance are listed below. In addition some others attended since the workshop was held at the time and place of the SCEC Leadership Retreat.

Michael Barall	Invisible Software	mbinv@invisiblesoft.com
Nick Beeler	USGS	nbeeler@usgs.gov
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Fred Pollitz	USGS	pollitz@usgs.gov
Keith Richards-Dinger	UC Riverside	keithrd@ucr.edu
John Rundle	UC Davis	rundle@ucdavis.edu
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Terry Tullis	Brown	Terry_Tullis@brown.edu
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Steve Ward   UC Santa Cruz   ward@es.ucsc.edu
Burak Yikilmaz   UC Davis   yikilmaz@geology.ucdavis.edu
Olaf Zielke   ASU/ Potsdam   olaf.zielke@asu.edu

BRIEF SUMMARY OF RESULTS

We found that the different simulators showed excellent agreement for the results for Problem 1, the stresses based on the Okada solution as well as for Problem 2, a simple strike slip problem with initial stresses that linearly ramp to a peak at a point 20 percent of the way from one end. We defined what we term Problem 3 to be worked on next, a problem with a single strike slip fault, but with different frictional properties on two halves of the fault. More of the results or the research can be found in our annual report for our 2008 grant "A Collaborative Project: Comparison, Verification, and Validation of Earthquake Simulators."