Hybrid Simulation at *nees@berkeley*

September 10, 2008
UC Berkeley, Richmond Field Station, *nees@berkeley*
http://nees.berkeley.edu

Hybrid simulation is a set of methods for examining the seismic response of structures using a hybrid model comprised of both physical and numerical sub-structures. This workshop on hybrid simulation, held in conjunction with the OpenSees Days workshop on September 8 and 9, is for NEES researchers. Attendees will:

1. Learn the fundamentals of the hybrid simulation method.
2. Learn about OpenFresco and OpenSees Navigator, our tools.
3. Conduct a hybrid simulation at the *nees@berkeley* NEES Equipment Site.
4. Be able to use hybrid simulation in NEES and non-NEES projects.
5. Prepare to develop new hybrid simulation tests and algorithms.

We will review the basics of hybrid simulation, including similitude requirements for model design, model implementation including integration methods, and simulation result interpretation. Then, we will demonstrate how hybrid simulation is implemented at *nees@berkeley* using our hardware and OpenSees and OpenFresco software. The attendees will have a unique opportunity to develop a hybrid model and, with the help of our staff, implement and run a hybrid simulation at *nees@berkeley*. Throughout the workshop we will demonstrate how to use the *nees@berkeley* Equipment Site hardware and software portfolio and how to process and archive hybrid simulation data.

Application Procedure

NOTE: This workshop is held in conjunction with **OpenSees Days**. Attendees are expected to be familiar with OpenSees: we strongly recommend attending the OpenSees Days workshop on September 8 and 9, 2008: register at http://opensees.berkeley.edu

Please apply at http://nees.berkeley.edu/workshop by August 25, 2008. A $50 workshop fee will cover the workshop meals and handouts. Limited travel support may be available for graduate students, young post-doctoral researchers and tenure-track faculty at US schools, pending approval from NEES Inc.

Logistics

The workshop will be held at the *nees@berkeley* Equipment Site located at the UC Berkeley Richmond Field Station (http://nees.berkeley.edu). Please refer to http://nees.berkeley.edu/workshop to find a list of hotels we recommend, and directions to arrive at the Richmond Field Station.

Tentative Agenda
September 10, 2008: EERC Classroom, Richmond Field Station

8:30am-9 Breakfast at *nees@berkeley*
9-noon Hybrid Simulation Basics
9:00-9:10 Welcome and introduction. (Stojadinovic)
9:10-10:30 Basics. Modeling and similitude. Sub-structuring. (Stojadinovic)

10:30-10:45 Coffee break

10:45-noon Integration methods. Simulation errors. (Stojadinovic)

noon-12:45pm Lunch

12:45-5:00 Hybrid Simulation Implementation at *nees@berkeley*
12:45-1:45 Implementation Framework: OpenFresco. (Schellenberg)
1:45-2:30 Hybrid Simulation: First demo (Whyte, Takhirov)

2:30-2:45 Coffee break

2:45-3:30 OpenSees Navigator: Tool for Hybrid Simulation (Yang)
3:30-3:45 Develop your own Demo: work in groups of three or four people (Stojadinovic)
3:45-4:15 *nees@berkeley* Lab tour (Stojadinovic)
4:15-4:45 Hybrid Simulation: Second demo (Whyte, Takhirov)
4:45-5:00 NEES-R Proposals: Past Experience and New Proposals (Stojadinovic)

5:00-5:15 Workshop review (Stojadinovic)
5:15-5:30 Attendee feedback

Instructor Information

Bozidar Stojadinovic, Professor (boza@ce.berkeley.edu)
Catherine Whyte, Graduate Student Researcher (cwhyte@ce.berkeley.edu)
Andreas Schellenberg, Doctoral Candidate (andreas.schellenberg@gmx.net)
Tony Yang, Post-doctoral Researcher (yangtony2004@gmail.com)
Shakhzod Takhirov, NEES-ES Staff Engineer (takhirov@berkeley.edu)