

Hybrid Simulation Workshop: Day 1 Review

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Hybrid Simulation

- ◆ Hybrid simulation is an experimentally based method for investigating the response of structure to dynamic excitation using a hybrid model
- ◆ A hybrid model is a an assemblage of one or more physical and one or more numerical, consistently scaled, substructures
- ◆ The equation of motion of a hybrid model under dynamic excitation is solved during a hybrid simulation test

Hybrid Simulation Basics

- ◆ Sub-structuring:
 - The main idea
- ◆ Similitude
 - Fundamental principle
- ◆ Integration methods
 - Time-stepping without reversals
- ◆ Errors and accuracy
 - How good is your test?

OpenSees Framework

- ◆ Powerful framework for structural analysis, that is transparent and (easily) extensible and scaleable
- ◆ OpenFRESKO implementation:
 - Object-oriented, based on OpenSees
 - Integrates physical and computer elements into a common domain
- ◆ MTS hardware
- ◆ OpenSees Navigator user interface

Preview: Day 2

- ◆ Hands-on: Part 1
 - Develop your own example
 - Hybrid test #1
- ◆ OpenSees modeling and simulation
- ◆ Hands-on: Part 2
 - Data and video at *nees@berkeley*
 - Hybrid test #2
- ◆ Hybrid simulation
 - Review and new directions

Thank you!

Development and operation of the nees@berkeley equipment site is sponsored by NSF.

<http://nees.berkeley.edu>

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