

2013 Coordination Workshop

From GMSV Wiki

Organizers: Nico Luco and C.B. Crouse

Date: Wednesday, April 3, 2013 (GMSV Workshop 08:00-15:00 | UGMS Meeting 15:00-17:00)

Location: SCEC Boardroom, University of Southern California, Los Angeles, CA

(<http://www.scec.org/aboutscec/maps/room169psa.html>)

Participants: 33 total

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Background & Objectives

The SCEC Ground Motion Simulation Validation (GMSV) Technical Activity Group (TAG) focuses on developing and implementing, via collaboration between ground motion modelers and engineering users, testing/rating methodologies for the use of ground motion simulations in engineering applications.

The two main purposes of this small workshop are 1) to coordinate the 2013 GMSV TAG projects with their 2012 counterparts and other related SCEC projects, namely the Software Environment for Integrated Seismic Modeling (SEISM) project, the Broadband Platform Validation Project, and the Committee for Utilization of Ground Motion Simulations (UGMS); and 2) to discuss a plan for future GMSV TAG projects.

The workshop will be followed by a two-hour meeting of the aforementioned UGMS committee, chaired by C.B. Crouse. The UGMS is initiating a pilot study with the objective of using 3-D numerical simulations, together with traditional empirical approaches, to develop long period ground motion maps for Los Angeles. These maps eventually may be introduced in a future edition of the NEHRP seismic provisions. Consequently, the UGMS committee consists of both seismologists and structural engineers.

Agenda

08:00 - 08:05 Welcome and overview of SCEC validation efforts

T. Jordan

08:05 - 08:15 Overview of agenda

N. Luco

2012 GMSV TAG Projects

08:15 - 08:30	Spectral correlations, polarization, and near-fault pulses in simulated ground motions	<i>J. Baker</i>
08:30 - 08:45	Validation of broadband ground-motion synthetics using earthquake engineering-relevant metrics	<i>K. Olsen</i>
08:45 - 09:00	US-Japan collaboration on strong ground motion prediction techniques	<i>P. Somerville</i>
09:00 - 09:15	Behavior of multiple broadband ground motion simulation techniques for a suite of earthquake scenarios using multiple rupture model generators on the SCEC Broadband Platform	<i>J. Bayless</i>
09:15 - 09:30	PBR science for SCEC4: Validation of ground motion prediction and simulations	<i>G. Biasi</i>
09:30 - 09:45	Discussion	<i>All</i>
09:45 - 10:00	<i>Break</i>	

Broadband Platform Validation Project

10:00 - 10:15	Update on validation plans	<i>C. Goulet</i>
10:15 - 10:30	Update on simulation plans	<i>P. Somerville</i>
10:30 - 11:00	Discussion	<i>All</i>

Software Environment for Integrated Seismic Modeling (SEISM) Project

11:00 - 11:10	GMSV using single-degree-of-freedom (SDoF) oscillators	<i>J. Baker</i>
11:10 - 11:20	GMSV for geotechnical systems	<i>J. Stewart</i>
11:20 - 11:30	GMSV for multi-degree-of-freedom (MDoF) nonlinear building systems	<i>N. Luco for I. Iervolino</i>
11:30 - 11:40	SEISM-OpenSees interface	<i>S. Rezaeian for F. Zareian</i>
11:40 - 12:10	Discussion	<i>All</i>

12:10 - 13:00 *Lunch*

2013 GMSV TAG Projects

13:00 - 13:15	Validating nonlinear site response prediction methodologies for SCEC broadband ground motion simulations	<i>D. Asimaki</i>
13:15 - 13:30	Simulation and validation of long-period earthquake ground motion in the Kanto Basin in Japan	<i>J. Bielak</i>
13:30 - 13:45	Discussion	<i>All</i>

Future GMSV TAG Efforts

13:45 - 13:50	Committee for utilization of ground motion simulations (UGMS)	<i>C.B. Crouse</i>
13:50 - 14:00	Simulated ground motions for building code response history analysis?	<i>N. Luco</i>
14:00 - 14:50	Discussion	<i>All</i>
14:50 - 15:00	Summary of discussion	<i>N. Luco</i>
15:00 - 15:10	<i>Adjourn GMSV TAG Workshop & Break</i>	

Committee for Utilization of Ground Motion Simulations (UGMS) Meeting

15:10 - 15:15	Call to order & introductions of attendees	<i>C.B. Crouse</i>
15:15 - 15:20	Introductory remarks & project motivation	<i>T. Jordan</i>
15:20 - 15:35	Pilot project objectives and technical approach	<i>C. Crouse</i>
15:35 - 15:50	Questions & discussion	<i>All</i>
15:50 - 16:00	Project schedule	<i>C. Crouse</i>
16:00 - 16:30	Discussion of technical & non-technical issues	<i>All</i>
16:30 - 16:45	Project organization & coordination	<i>C. Crouse & All</i>
16:45 - 16:50	Action items & assignments	<i>All</i>
16:50 - 16:55	New members & next meeting	<i>All</i>
16:55 - 17:00	Closure & adjourn	<i>T. Jordan</i>

Participants

Attending In-Person: Norm Abrahamson (PG&E/UC Berkeley), Dominic Asimaki (Georgia Tech), Bob Bachman (Engineering Consultant), Jack Baker (Stanford), Jeff Bayless (URS), Glenn Biasi (UNR), Jacobo Bielak (CMU), CB Crouse (URS), Greg Deierlein (Stanford), Christine Goulet (UC Berkeley), Rob Graves (USGS), Tran Huynh (USC/SCEC), Tom Jordan (USC/SCEC), Nicolas Luco (USGS), Phil Maechling (USC/SCEC), Kim Olsen (SDSU), Sanaz Rezaeian (USGS), Andreas Skarlatoudis (URS), Paul Somerville (URS), Jon Stewart (UCLA), Ricardo Taborda (CMU), Feng Wang (USC)

Attending Remotely: Brad Aagard (USGS), Jared DeBock (CU Boulder), Carola Di Alessandro (GeoPentech), Art Frankel (USGS), Carmine Galasso (AIR), Ron Hamburger (SGH), Steve Hartzell (USGS), Abbie Liel (CU Boulder), Morgan Moschetti (USGS), Ellen Rathje (UT), Farzin Zareian (UCI)

Unable to Attend: John Anderson (UNR), Ralph Archuleta (UCSB), Greg Beroza (Stanford), Brendon Bradley (Canterbury), Jorge Crempien (UCSB), Steve Day (SDSU), Curt Haselton (Chico State), John Hooper (MKA), Iunio Iervolino (UNINA), Charlie Kircher (Kircher & Associates), Farzad Naeim (John A Martin), Mark Petersen (USGS)

Committee for the Utilization of Ground Motion Simulations: Norm Abrahamson (PG&E), John Anderson (UNR), Bob Bachman (Engineering Consultant), Jack Baker (Stanford), Jacobo Bielak (CMU), C.B. Crouse (URS), Art Frankel (USGS), Rob Graves (USGS), Ron Hamburger (SGH), Curt Haselton (CSU Chico), John Hooper (MKA), Charlie Kircher (Kircher & Associates), Nico Luco (USGS), Farzad Naeim (John A Martin), Mark Petersen (USGS), and Paul Somerville (URS).

Summary of Outcomes

- The validation efforts of the SEISM project can be thought of as development of validation "gauntlets" of ground motion simulation tests for 1) inelastic SDoF oscillators, 2) geotechnical systems, and 3) nonlinear MDoF buildings.
- All of the validation gauntlets will be developed and demonstrated using the simulated ground motion time series from the Broadband Platform Validation Project that will be available in June (2013). As explained in a bullet below, the validation gauntlets will be automated in order to facilitate tests of future/other ground motion simulations.
- The principal engineering applications for which the validation gauntlets will be developed are nonlinear response history analysis (NRHA) of MDoF buildings and nonlinear site response analysis (SRA) in building codes. Note that the Broadband Platform Validation Project is currently focused on the use of ground motion simulations in developing the median part of ground motion prediction equations for elastic spectral acceleration.
- In addition to SRA, parallel validation gauntlets for the use of simulated ground motions in geotechnical analysis of slope displacements and/or liquefaction might be developed.
- In addition to NRHA of buildings, a parallel validation gauntlet might be developed for NHRA of bridges.
- Mainly to compare against the results of the other validation gauntlets, a parallel gauntlet will also be developed for inelastic SDoF oscillator responses.
- The first of two types of tests in each validation gauntlet will compare the geotechnical or structural analysis responses to the simulated ground motions against those to recorded ground motions *that have substantially similar response spectra (elastic or inelastic)*. This type of validation test will isolate any discrepancies between the simulated and recorded ground motions beyond those in response spectra. They can also serve as tests of the use of simulated ground motions from an archive/database for building code NRHA and SRA applications. Currently, recorded ground motions selected from a database and scaled/modified to approximately match a target elastic response spectrum are, for the most part, used in these applications.
- The second type of validation test in each gauntlet will compare against the geotechnical or structural analysis responses to recorded ground motions from corresponding historical earthquake and station locations. This type of test will convolve any discrepancies in the response spectra of the simulated and recorded ground motions with any discrepancies isolated in the preceding bullet. Note that for these validation tests the simulated ground motion time series from the Broadband Platform Validation Project, or their recorded counterparts, will need to be adjusted for the site profile at each station location.
- In the validation gauntlet for inelastic SDoF oscillator responses, a third test against existing ground motion prediction equations (e.g., Tothong & Cornell, 2006) will be included.
- As mentioned in a bullet above, the validation gauntlets will be automated in the Broadband Platform in order to facilitate tests of future ground motion simulations. Part of this automation will be the computation of the geotechnical and structural analysis responses, which will be accomplished via a user-friendly interface to the

OpenSees (Open System for Earthquake Engineering Simulations) software framework. The OpenSees interface will also facilitate running other simulated ground motions (not necessarily from the Broadband Platform) through the developed validation gauntlets.

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2013 Progress and Planning Workshop

From GMSV Wiki

Organizers: Nico Luco & Sanaz Rezaeian

Date: Sunday, September 8, 2013 (13:00-17:00)

Location: Hilton Palm Springs Resort, Palm Springs, CA (<http://www3.hilton.com/en/hotels/california/hilton-palm-springs-PSPPSHF/index.html>)

Participants: 142 registrants (view list) (http://www.scec.org/workshops/participants_all.php?event=2050&question=yesno08&title=2050)

Webpage: <http://www.scec.org/workshops/2013/gmsv/index.html>

Background & Objectives

The SCEC Ground Motion Simulation Validation (GMSV) Technical Activity Group (TAG) focuses on developing and implementing, via collaboration between ground motion modelers and engineering users, testing/rating methodologies for the use of ground motion simulations in engineering applications. The purpose of this half-day workshop at the SCEC Annual Meeting was to:

- Share recent progress on GMSV TAG projects, such as those coordinated for the broader SCEC Software Environment for Integrated Seismic Modeling (SEISM) project; and
- Discuss plans for future GMSV TAG projects, such as those that will support the SCEC Committee for Utilization of Ground Motion Simulations (UGMS).

This workshop was preceded by a half-day workshop of the SCEC Broadband Platform validation project (<http://www.scec.org/workshops/2013/bbp/index.html>), which is a separate but coordinated GMSV effort.

Agenda

Presentation slides may be downloaded by clicking each title. PLEASE NOTE: Slides are the author's property. They may contain unpublished or preliminary information and should only be used while viewing the talk.

13:00 - 13:05	Welcome and overview of various SCEC validation efforts	<i>T. Jordan</i>
13:05 - 13:15	Explanation of objectives of workshop and agenda (http://www.scec.org/workshops/2013/gmsv/1305_Luco.pdf)	<i>N. Luco</i>
GMSV TAG Efforts for SCEC SEISM Project		
13:15 - 13:30	Focus of "GMSV-SEISM" efforts (http://www.scec.org/workshops/2013/gmsv/1315_Luco.pdf)	<i>N. Luco</i>
13:30 - 13:50	Validation for engineering analysis using simple and robust ground motion parameters (http://www.scec.org/workshops/2013/gmsv/1330_Baker.pdf)	<i>J. Baker</i>
13:50 - 14:10	Validation for building-code nonlinear response history analysis (http://www.scec.org/workshops/2013/gmsv/1350_Zareian.pdf)	<i>F. Zareian</i>
14:10 - 14:30	Validation approach for application of simulated ground motions to duration-sensitive geotechnical systems (http://www.scec.org/workshops/2013/gmsv/1410_Afshari.pdf)	<i>K. Afshari for J. Stewart</i>
14:30 - 14:55	Discussion of "GMSV-SEISM" efforts	<i>All</i>
14:55 - 15:10	<i>Break</i>	

Other GMSV TAG Efforts

15:10 - 15:30	Overview of GMSV TAG efforts presented elsewhere (http://www.scec.org/workshops/2013/gmsv/1510_Rezaeian.pdf)	<i>S. Rezaeian</i>
15:30 - 15:45	Validation of earthquake simulations and their effects on tall buildings considering spectral shape and duration (http://www.scec.org/workshops/2013/gmsv/1530_Lin.pdf)	<i>T. Lin</i>
15:45 - 16:00	Validation of ground motion simulations for seismic slope stability (http://www.scec.org/workshops/2013/gmsv/1545_Rathje.pdf)	<i>E. Rathje</i>
16:00 - 16:15	Support of SCEC Committee for Utilization of Ground Motion Simulations (UGMS) (http://www.scec.org/workshops/2013/gmsv/1600_Rezaeian.pdf)	<i>S. Rezaeian for C.B. Crouse</i>
16:15 - 17:00	Discussion of Future GMSV TAG Efforts	<i>All</i>
17:00	<i>Adjourn</i>	

Summary of Outcomes

- GMSV-SEISM efforts need even more coordination. Monthly webconferences were discussed.
- GMSV TAG projects of Lin *et al* and Rathje *et al* also need to be tightly coordinated with the GMSV SEISM efforts.
- In particular, validation using the simple ground motion parameters that are common amongst the projects (e.g., significant duration) should be very tightly coordinated. In fact, calculation of these parameters should be added to the Broadband Platform (BBP). Validation figures analogous to those currently generated on the BBP for elastic spectral acceleration could also be generated for the additional simple parameters.
- [Click here](http://collaborate.scec.org/gmsv_wiki/images/Straw_Man_Acceptance_Criteria_for_Ground_Motion_Simulation_Validation.pdf) (http://collaborate.scec.org/gmsv_wiki/images/Straw_Man_Acceptance_Criteria_for_Ground_Motion_Simulation_Validation.pdf) for a preliminary candidate list of "simple" (and other) ground motion parameters for which validation could be added to the BBP.
- A bullet should be added to the Science Collaboration Plan for comparisons of simulated versus recorded ground motions for different models of the regional geologic structure.
- An organized effort to incorporate geotechnical site response into SCEC ground motion simulations should be encouraged in the Science Collaboration Plan. Perhaps a separate Technical Activity Group should be established for this effort.
- Validation of CyberShake in support of the UGMS Committee is needed and important, and a few investigators have already begun this, but at this stage a group effort that is analogous to the BBP validation project is likely premature. For now, additional individual but coordinated projects on the topic should be encouraged in the Science Collaboration Plan. In particular, investigations of observed vs. simulated region-specific path effects for small-magnitude earthquakes should be encouraged. Ground motions for many small-magnitude earthquakes can be found in the Pacific Earthquake Engineering Research Center (PEER) NGA-West2 database.

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