

Minutes of the 9th meeting of IASSAR Subcommittee 1 on Computational Stochastic Mechanics

Attending: Gerhart Schueller (chair), Univ. of Innsbruck
Erik Johnson (recorder), USC
Lawrence Bergman, UIUC
George Deodatis, Princeton Univ.
Ove Ditlevsen, DTU
Roger Ghanem, JHU
Mircea Grigoriu, Cornell Univ.
Arvid Naess, NTNU
Fabrice Poirion, ONERA
Helmut Pradlwarter, Univ. of Innsbruck
Pol Spanos, Rice Univ.

Regrets from Walter Wedig, Univ. of Karlsruhe and Bill Spencer, Univ. of Notre Dame

Date: Intern. Conf. on Monte Carlo Simulation (MCS_2000), Monte Carlo, Sunday, June 18, 2000, 4 - 6 pm.

Venue: ABELA HOTEL MONACO, 23, Avenue des Papalins, 98000 Monaco.

The meeting began at 4pm on 18 June 2000.

1. Welcome of members

The members in attendance (listed above) were welcomed by the subcommittee chair, Prof. Schueller.

2. Approval of the Minutes of the 8th meeting held at the JHU in Baltimore

The minutes of the 8th meeting (Baltimore) were distributed and approved without discussion (except correcting the spelling of Prof. Grigoriu's last name).

3. Organizational Matters/Membership

A current list of SC1 member addresses/phone/fax/e-mails was circulated and corrected as needed by the members.

4. Report on participation at meetings on Computational Stochastic Mechanics

Prof. Ghanem reported that the U.S. National Congress on Computational Mechanics (USNCCM) was well attended and significant interest in uncertainty principles was demonstrated. The next meeting is

in (Detroit?) Michigan in summer (August?) 2001. Prof. Ghanem reserved two sessions on computational stochastic mechanics (cooperating with Prof. Deodatis in organizing these sessions) and one session on micromechanics. Prof. Ghanem and Prof. Deodatis will correspond with the Subcommittee members about involvement, and the Subcommittee will support these efforts. There was general discussion and agreement of the need for continued interfacing with the deterministic computational mechanics community.

Prof. Schueller reported that the ECCM'99 was very well attended and had significant interest in stochastics as well. He reported that the next World Conference on Computational Mechanics will be held in Vienna in 2002.

Prof. Grigoriu reported that a book on computational mechanics was recently published (editor from RPI) that contains one chapter on stochastic aspects.

5. Reports from the Working Groups

5.1 Influence of Stochastic Computational Methods on the Development of Design Codes (Ghanem)

Prof. Ghanem has had some interaction with ACI, particularly with their investigation into how information technology may change the future of concrete use.

Prof. Ghanem gave a brief discussion of the layout of HTML and how it defines a standard for web pages. XML is an extension (eXtended Markup Language) that allows extensions to include other types of data. For example, one could define a tag for stochastic processes:

```
<xml http://www.IASSAR.org/>
<stochasticprocess ...>
< define the properties of the stochastic process here>
</stochasticprocess>
</xml>
```

Applications can be written in Java, CORBA, C++, etc. Prof. Ghanem proposed that a syntax be developed and several applications written to demonstrate the use of the language. Conceivably, then, a large application (e.g., a finite element code) could take advantage of a "service" for stochastic response (among other services such as meshing, equation solving, post-processing, etc.).

There was some question as to whether this is the same idea as already implemented with packages like PATRAN that interface with many different finite element packages. The difference here is that it would be an open standard that is extensible. This is clearly an activity focused more on the future and possible use in code development. There are significant legal questions here since this may have an impact on how design is done.

5.2 Parallel Computing (Bergman/Spencer/Johnson)

Prof. Bergman reported on the second working group progress. A 40-page (and growing) draft of a document on parallel applications is the current state of the WG efforts. The WG welcomes a contribution from others (e.g., a parallel stochastic finite element application). It is thought that this could be a state-of-the-art paper possibly suitable for Probabilistic Engineering Mechanics.

5.3 Monte Carlo Simulation

5.3b Fragility Curves (Deodatis)

Prof. Deodatis reports that he has received a current draft of a document from Prof. Der Kiureghian (~15 pages, will be 20 with figures); Prof. Deodatis' contribution is about 20 pages, and the combined effort of Prof. Grigoriu and Prof. Shinozuka is currently about 15 pages. So a report of about 50 pages will probably be available some time later this year.

Prof. Schueller urged both Deodatis/WG3b and Bergman/WG2 to send a PDF of these working papers to Prof. Ditlevsen for publishing on the IASSAR web site.

5.3a Efficient Algorithms (Pradlwarter)

Prof. Pradlwarter reported that the WG on MCS is more in its infancy. A questionnaire was distributed this Spring to solicit areas of interest from the WG members for what they can contribute to a state-of-the-art paper. Prof. Pradlwarter says that connections with stochastic finite elements are important to the development of this paper. Prof. Schueller noted again that for stochastic dynamics, the problems are still rather small (in DOFs for example) compared to those in deterministic computational mechanics. Making connections with those doing larger (i.e., "real") systems is important. Prof. Ditlevsen said that it's a two-stage process.

Prof. Schueller thought that perhaps WGs 2 and 3 should go ahead and do state-of-the-art papers and move forward with pursuing journal publication. The other WGs can move forward at their own pace.

Prof. Pradlwarter will be outlining what the report will look like and how the contributors' work can fit together.

6. Further steps, tasks

ICOSSAR '01 is coming up next year in 2001 in Newport Beach, CA. SC1 is sponsoring 2 sessions, and Grigoriu is contributing an additional session.

The SC members are urged to note in their ICOSSAR papers that their papers related to the SC are sponsored by the SC. Further abstracts are welcome; Prof. Schueller will send out another reminder e-mail and urged the members to submit another abstract if possible and to bring it to the attention of their colleagues that the Call for Papers is still open. Nevertheless, he is optimistic with the report of Prof. Corotis during earlier ICOSSAR meetings that the response in recent weeks has been good.

Prof. Schueller will notify the SC by e-mail of some of the other related conferences in 2001.

7. Date and venue of next meeting

The next meeting will be during ICOSSAR in June 2001 in Newport Beach.

8. Other Business

Prof. Ditlevsen (chair of the IASSAR umbrella committee) noted that SC1 is one of the most active subcommittees of IASSAR.

9. Adjournment

The meeting was adjourned at 6pm.