

WCCM VIII – ECCOMAS 2008

8th World Congress on Computational Mechanics (WCCM8)

5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)

30 June – 5 July 2008, Lido Island, Venice, Italy

<http://www.iacm-eccomascongress2008.org/>

Minisymposium: Advances in Computational Stochastic Mechanics

Scope of the Minisymposium

Computational Stochastic Mechanics refers to the analysis of engineering systems with material/geometric properties and/or loads modelled by random processes and fields. Extensive research efforts have been devoted to this subject in the past two decades. The majority of the work has been focused on developing Stochastic Finite Element Methodologies (SFEM) for the numerical solution of the arising stochastic differential equations. Another intensively researched topic is the analysis of systems subjected to stochastic (dynamic) excitation. Although the methods developed have proven to be highly accurate and computationally efficient for a wide range of problems in the aforementioned topics, there are still several classes of problems in stochastic mechanics involving combinations of statistically high dimensions, strong nonlinearities, large variations and non-Gaussian description of uncertain parameters that can be solved with reasonable accuracy only through a computationally expensive Monte Carlo simulation approach. Therefore, the efficient computational treatment of such problems is of paramount importance in large-scale, real-world applications incorporating stochastic concepts.

This Minisymposium on “*Advances in Computational Stochastic Mechanics*”, which is organized in the framework of the WCCM VIII and ECCOMAS 2008 Conferences, aims at presenting the current state-of-the-art in the field of large-scale computations for general stochastic problems involving linear and/or nonlinear, static and/or dynamic behaviour. In this respect, the Minisymposium is concerned with computational methodologies for stochastic mechanics applications (simulation procedures, perturbation methods, approximate solutions, etc.), efficient algorithms to accelerate the solution of the resulting systems of equations (solution methods, preconditioning techniques, parallel processing schemes, etc.), modelling approaches for stochastic uncertainties in structural properties and loads, methods for improving the efficiency of the Monte Carlo Simulation by reducing the required sampling size, alternative formulations to SFEM, as well as engineering applications involving large-scale stochastic analyses in general.

The Minisymposium Organizers:

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