

EVALUATION, RELIABLE ESTIMATION, AND CONTROL OF COMPUTATIONAL ERRORS IN SOLID AND STRUCTURAL MECHANICS

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ABSTRACT

The numerical methods proposed for analysis of structural behaviours are at the stage that different types of behaviours, materials, nonlinearities, and their interactions, can be taken into account and even defined in the analyses. Nevertheless, as an inherent nature of numerical computations, the results are generally inexact. This inexactness though can be small and simply upper estimated for many linear analyses, can not be easily evaluated, at least in a reliable manner, for complicated linear, and most of nonlinear analyses, e.g. analyses involved in impact, and linear-elastic/perfectly-plastic behaviours. This impairs practical implementation of the results in engineering designs, especially with attention to the fact that in today's complicated world of structural engineering, the speed of technological progress is such that, the roles of engineering experience and intuition diminish day by day. Accordingly, the essentiality of analyzing the computational errors, and reliably controlling the errors, becomes more apparent day by day. In the last decades, many efforts are carried out in this regard. Still, the issue is open for further discussions. Based on these considerations, the main objective of this mini-symposium is to bring together different ideas about errors evaluation, estimation, and control, where, in the friendly atmosphere of WCCM2014, the challenges will be discussed towards more reliable implementation of the results of numerical analyses in engineering practice and decision-makings. Special attention will be given to nonlinear dynamic problems, problems involved in highly nonlinear behaviours, problems involved in severe oscillatory behaviours, and considering practical issues, also to problems originated in seismic analyses. Not being restricted to special structural behaviours, this mini-symposium can be considered related to many topics of the congress, including *Computational Nonlinear Dynamics, Verification and Validation*, etc.

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