

**Seminar - April 28, 2015, 4:00 pm, room A11**

**Polytechnic School, University of Genoa, Via Montallegro 1, Genova, 16145**

## **Coupled domain decomposition – Proper Orthogonal Decomposition methods for the simulation of non-linear and multi-physics problems**

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A computational strategy for the simulation of multi-physics and non-linear, irreversible problems, based on a combined use of Domain Decomposition (DD) and Proper Orthogonal Decomposition (POD) Model Order Reduction (MOR) techniques, is presented and discussed. The strategy was recently proposed by the author and exploits the potentialities of the coupled use of DD and POD methods. Applications have been done for the solution of the coupled electro-mechanical problem in microsystems, the simulation of dynamic elasto-plastic structural problems, the study of fracture propagation in quasi-brittle polycrystalline materials. More recently, the approach was extended to the simulation of the fully coupled thermo-elastic problem. The numerical examples that will be presented concern applications to electrostatically driven micro-resonators, polycrystalline silicon, elasto-plastic frames.

Alberto Corigliano is professor of Solid and Structural Mechanics at the Department of Civil and Environmental Engineering of the Politecnico di Milano. He teaches courses on “Computational Mechanics”, “Advanced Structural Mechanics”, “Advanced Fracture Mechanics”, “Micro-Electro-Mechanical Systems”. He spent periods of research at the Laboratoire de Mécanique et Technologie of the E.N.S.-Cachan (FR) and at the Department of Mechanical Engineering of Northwestern University, Evanston (IL, USA) as researcher and invited professor. Member of the technical committee of Eurosim (Thermal, mechanical and multi-physics simulation and experiments in micro-electronics and micro-systems), IUTAM Symposia Panel for Solid Mechanics. Chairman of the European Solid Mech. Conference Committee (ESMCC). Prof. Corigliano is Associate Editor of the European Journal of Mechanics A/Solids, of the Journal Advanced Modelling and Simulation in Engineering Sciences and Frontiers in Materials – Mechanics of materials. In 2006 he won the Bruno Finzi prize for Rational Mechanics given by the “Istituto Lombardo Accademia di Scienze e Lettere”. In 2015 he was appointed Euromech Fellow by the European Mechanics Society. He is author (co-) of more than 240 papers, co-author of two scientific monographs, one book for graduate students and of 5 invited chapters in books. A. Corigliano is also co-author of 5 deposited Patents and 2 Patents on Microsystems.

His research activity has covered a wide range of subjects in the fields of structural and materials mechanics, with particular reference to theoretical and computational problems relevant to non-linear material responses. His present main research interests concern: quasi-brittle and ductile fracture mechanics; composite damage and delamination; Micro-Electro-Mechanical-Systems (MEMS) and micromechanics.

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