Univerza *v Ljubljani* Fakulteta *za strojništvo*



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Vljudno vabljeni na predavanje:

Stochastic Analysis, Optimization and Robustness of Deformation Processes,

Prof. Dr. Ioannis Doltsinis, Faculty of Aerospace Engineering & Geodesy, University of Stuttgart

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The lecture deals with the impact of randomness in the analysis and design of material deformation processes. In this connection the purpose of design is recalled, sources of randomness are enumerated and the quality assessment in the presence of randomness is discussed.

For the mathematical description, the deformation process is modelled as an input – output system. Two alternative methods of stochastic analysis are presented: the synthetic Monte Carlo sampling as a statistical technique and the analytical Taylor series expansion as a non-statistical approach. Beyond the assessment of the random output for given input, the employment of either method in process design is discussed. The wider purpose is a specification of the process parameters for achieving the desired outcome, process optimization included. The latter issue necessitates consideration of product robustness with respect to fluctuating design parameters; this is of importance for the quality of serial production in particular.

In conclusion, it is seen that methods of stochastic analysis and design can be based on available deterministic tools. Application of the methods is demonstrated for the analysis of problems from impact dynamics and for the optimum design of robust manufacturing processes including extrusion and net shape forming.

O predavatelju:

Prof. Dr. Ioannis Doltsinis holds the Venia Legendi at the University of Stuttgart. His current teaching assignments comprise advanced courses in Elastoplastic Structures, and Stochastic Analysis and Optimization in the Faculty of Aerospace Engineering. He has been Deputy Director of the Institute for Computer Applications at Stuttgart University, leader of several scientific groups and research projects, Visiting Professor at the University of Trento, Scientific Advisor for numerous research foundations on the national and the international level.

Dr. Doltsinis has been working on the development of computer methods in the field of nonlinear mechanics of solids and fluids from the very beginning. He has performed and directed research with significant achievements in the fields of Elastoplastic Structures, Nonlinear Fracture Mechanics, Wide-span Lightweight Structures, Thermomechanics of Inelastic Solids, Material Deformation Processes, Strength of Ceramic Materials, Computational Fluid Dynamics, Fluid-structure Interaction, Re-entry Aerodynamics, Stochastic Mechanics. He is author of numerous papers published in professional journals, editor of thematic scientific publications and author of the books: Elements of Plasticity – Theory and Computation, now in 2nd Edition, and Large Deformation Processes of Solids – From Fundamentals to Numerical Simulation and Engineering Applications.

Vljudno vabljeni!

Prof. dr. Jožef Duhovnik DEKAN