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First, the Guest Editors are grateful to all authors for their effort in writing the papers in time and acknowledge the outstanding work of all reviewers, allowing this Special Issue to be published as planned. The Guest Editors also would like to thank Professor Marcílio Alves (Editor-in-Chief of LAJSS) for the opportunity to produce this Special Issue related to the MECSOL 2019 – 7th International Symposium on Solid Mechanics, which was promoted by the Brazilian Society of Mechanical Sciences and Engineering – ABCM, and organized by its Committee of Solid Mechanics, from April 15th to 17th, 2019, in Sao Carlos, Sao Paulo, Brazil.

MECSOL 2019 had the presence of 102 delegates from different countries (Brazil, Portugal, Italy, USA and Germany), where 33 participants were Professors or researchers with PhD degree, and the others were Master or PhD students. Among various invited and contributing authors, the conference featured plenary lectures by Prof. Sergio P. B. Proença from São Carlos School of Engineering of the University of São Paulo (Brazil); Prof. Ramesh Talreja from Department of Aerospace Engineering, Texas A&M University (USA); Prof. Maurício Vicente Donadon from Instituto Tecnológico de Aeronáutica-ITA, Department of Aeronautics (Brazil); Dr. Nicholas Fantuzzi from University of Bologna (Italy); Prof. Eduardo Alberto Fancello from Universidade Federal de Santa Catarina (Brazil); Prof. Rui Miranda Guedes from Universidade do Porto (Portugal). This shows the high level of the event in terms of the presentations and the works published in the Procedures of MECSOL 2019.

This Special Issue publishes improved and enlarged versions of 10 (ten) articles presented at MECSOL 2019, which covered different topics such as Fatigue and Failure Analyses; Composite Materials and Structures; Elasticity, Plasticity, Damage and Fracture Mechanics: Models, Experiments and Applications; Viscoelasticity and Viscoplasticity: Models, Experiments and Applications; Impact Engineering; Structural Reliability Methods and Reliability-Based Design Optimization; Optimization of Materials, Fluids and Structures; Numerical Methods: FEM, XFEM, GFEM, BEM and others methods; Nonlinear Analyses: Buckling, Post-Buckling and Contact Analyses. In other words, this Special Issue is devoted to scientists and engineers, who are investigating recent developments in analysis and state-of-the-art techniques on Solid Mechanics.

Lima et al. [1] described an analysis of the dynamic response of coupled soil-pile-foundation systems. This work presents the influence of three issues on the vertical dynamic foundation response. The analysis presented in the article allows an in-depth understanding of the dynamic response of coupled soil-pile-foundation systems.

Pellizzer et al. [2] discussed the time-dependent reliability of reinforced concrete considering the boundary element method. Corrosion of reinforcing bars caused by chloride ions is one of the main pathological manifestations. Therefore, the time-variant reliability problem is solved using Monte Carlo simulation with several applications.

The exact solution for the buckling problem of cylindrical panels have been presented by Soares et al. [3]. These structures have frames attached to the circular edges. The boundary conditions differ from the classical simply supported ones, often assumed for design purposes, in the sense that the torsion resisted by the frames are also taken into account. Results are reported for valuable benchmarks in future studies.

Anisotropic damage propagation has been presented by Petrini et al. [4] using a thermodynamically consistent phase field framework. In particular the present approach is adapted to include the effect of preferential cleavage planes

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in the damage evolution. The simulations showed that the model can reproduce the expected crack propagation pattern for materials with one and two preferential directions.

Aguiar et al. [5] investigated the influence of the number of holes and boundary layer of a solid with finite dimensions on the determination of these effective properties of nonhomogeneous solids. This investigation represents an ongoing effort of the research group to obtain the effective moduli of elastic solids using analytical, computational, and experimental methods.

Monteiro et al. [6] presented a finite element formulation for planar frame beams piezoelectric sensor layers. The description considers small strains but large rotations. An iterative Newton-Raphson algorithm is employed for the numerical solution of the present problem.

Cordeiro et al. [7] presented a three-dimensional assessment of the stress intensity factor calculation using a displacement fitting technique and a dual Boundary Element Method. The proposed higher order technique has demonstrated superior performance in comparison with the conventional displacement fitting technique given in the literature.

In the context of solid-structure interaction in terms of dynamic response Tovo et al. [8] investigated an iterative coupling procedure. The structure and the soil are divided into subsystems and the solution for each subsystem is formulated by the best suited methodology to analyze the problem. The obtained numerical results are compared to those given by considering both subsystems totally coupled.

Massaroppi Jr. et al. [9] presented the collapse of tapered I-beams of large span. The research is presented in the context of steel frames and a finite element model is validated according to the several design parameters in place.

Araujo et al. [10] discussed topology optimization applied to continuum elastic structures. The primary purpose of the research is to demonstrate the checkerboard-free property of the generalized finite-volume theory. The topology optimization algorithms is performed by using a mesh independent filter, that regularizes the subvolume sensitivities, providing optimum topologies that avoid the mesh dependence and length scale issues by minimizing the formation of local paths.

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