

THE FUTURE OF APPLIED MECHANICS – EDITORIAL

The current issue of the *Romanian Journal of Technical Sciences – Applied Mechanics* features eight contributions that highlight modern advancements in both fundamental and applied research across structural mechanics, advanced materials, robotics, and medical engineering. Renowned scholars from both the Romanian and international academic communities author these works.

One significant focus of this volume is the dynamics of mechanical structures and their analytical modeling.

The paper by *Lobontiu et al.* proposes a matrix approach for modeling serial planar mechanisms with flexible joints, emphasizing the evaluation of eigenfrequencies and forced responses in relation to system geometry.

In a complementary study, *Stănescu* investigates the optimization of displacements of a shared point in composite structures, providing valuable mathematical tools for multi-objective analyses in systems with multiple degrees of freedom.

Another central theme is advanced materials. *Sorohan* and collaborators analyze the versatility of functionally graded materials (FGMs) in optimizing stress distributions in radially symmetric bodies. They showcase the benefits of iterative techniques and finite element modeling for enhancing safety and structural performance.

Marina introduces an original method for determining macroscopic elasticity constants in multiphase polycrystalline materials, highlighting the complex relationship between microscopic parameters and macroscopic responses through the use of statistical and self-consistent models. Additionally, *Bellini* examines the interlaminar shear behavior in a GLARE laminate, illuminating damage accumulation mechanisms and failure modes, particularly delamination, which are characteristic of fiber-metal hybrid laminates.

In the field of medical robotics, *Rus* leads a paper that presents a modular spherical robot designed for minimally invasive laparoscopic surgery. This study addresses dynamic balancing, rigidity, and kinematic optimization for high-precision operations within constrained anatomical spaces.

Kovacik and colleagues investigate the relationship between geometric shape and composition on the compressive behaviour of aluminum-based metal foams, emphasizing their importance for energy absorption systems, seismic protection, and thermal storage.

Vinteler explores the vibration phenomena of coins, analyzing both classical and Mindlin models for thin circular plates. This research has practical implications for determining the elastic properties of minting alloys. This interdisciplinary

approach, bridging theory and experimentation, aids in identifying and characterizing materials based on their dynamic responses.

Overall, this issue reflects the diverse interests present in mechanical engineering and materials science today. It promotes a synthesis of analytical analysis, advanced numerical simulation, and experimental application in contemporary contexts, ranging from optimizing industrial structures to advancing medical robotics and material innovation. The variety of topics and the depth of approaches showcased in this volume illustrate the vibrancy of the scientific community, fostering interdisciplinary dialogue and supporting technical development and academic innovation.

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