9th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMA2024)
June 3-7, 2024, Lisbon, Portugal

INTERDISCIPLINARITY IN APPLIED MECHANICS AND COMPUTATIONAL MECHANICS

1700

P. AREIAS*

* Instituto Superior Técnico
Av. Rovisco Pais 1
1049-001 Lisboa
pedro.areias@tecnico.ulisboa.pt

Key words: Applied and Computational Mechanics, Computational Material Science, Interdisciplinary advances,

ABSTRACT

Results of cross-pollination between pure Science and Engineering are recognized by both communities. Due to long-standing collaboration programs, Engineers are now able to create optimal parts, to optimize existing parts, to precisely predict the failure of a given part and even efficiently solve large combinatorial problems. Theory unification percolated to Engineering, with a remarkable example of this being the merging of the themes of fracture, topology optimization, image segmentation and distance determination in contact [1]. Intense interdisciplinary work with the areas of pure and applied Mathematics, especially (abstract) Algebra and Analysis have greatly improve the scope and effectiveness of the Engineering solutions. Significant advances in Applied/Continuum Mechanics, such as constitutive analysis and formalism, stability analysis, proofs of existence and uniqueness of solutions and classification of problems were achieved with the contributions from pure and applied Analysis. Results from Mathematical and Computational Physics have significantly contribute to recent developments in Computational Mechanics. In addition, Computational Mechanics has greatly evolved with the contributions from Computer Science with the emergence of deep learning as an important tool.

In this minisymposium, we welcome the following themes:

- Contributions in the areas of contact mechanics, frictional contact mechanics and cohesive fracture without ad-hoc solutions.
- Established algorithms which can be relevant for Computational Mechanicians
- Computational Physics applications and developments relevant for Mechanicians, including consistent Multiphysics.
- Computational Materials Science developments.

REFERENCES

[1] P.Areias, N.Sukumar, J. Ambrósio “Continuous gap contact formulation based on the screened Poisson equation. *Computational Mechanics*, 2023. in press