14th World Congress on Computational Mechanics (WCCM XIV)
8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)
July 19- 24, 2020, Paris, France

COMPUTATIONAL FRAMEWORKS FOR COMPLEX FINITE DEFORMING SYSTEMS

JAVIER BONET*, ANTONIO GILL† CHUN H. LEE‡, AND MICHAEL I. OKEREKE↑

* University of Greenwich, Greenwich Campus, London. (J.Bonet@gre.ac.uk)

† Zienkiewicz Centre for Computational Engineering, College of Engineering, Swansea University, Bay Campus, SA1 8EN, United Kingdom (A.J.Gil@swansea.ac.uk)

‡School of Engineering, University of Glasgow, Glasgow, Scotland (ChunHean.Lee@glasgow.ac.uk)

↑Mathematical Modelling for Engineering Research Theme, Department of Engineering Science, University of Greenwich, Medway Campus, Kent. (M.I.Okereke@gre.ac.uk)

Key words: large strain, finite deformation, nonlinear solid mechanics, impact dynamics

ABSTRACT

Finite deforming systems are characterized by large strains often in order of hundreds of percentages. Such systems can include stent deployment during coronary angioplasty; electro-activation in cardiac mechanics[1]; finite deforming thin structures [2]; polymeric macromolecular deformation [3] and virtual testing of textile composites, etc. There is need however to continue developing new computational frameworks for dealing with the peculiar challenges of finite deforming systems[4]. There are several emerging ideas that are being developed in many research groups, and there is need to gather these ideas and discuss them under a common mini-symposia. Therefore, the objective of this proposal is to gather researchers from different teams working on the challenges surrounding developing numerical convergent solutions with high predictive fidelity for finite deforming systems.

REFERENCES

1. Garcia-Blanco, E.; Ortigosa, R.; Gil, A. J.; Lee, C. H.; Bonet, J. A new computational framework for electro-activation in cardiac mechanics. *Comput. Methods Appl. Mech. Eng.* **2019**, *348*, 796–845, doi:10.1016/J.CMA.2019.01.042.

2. Terrana, S.; Nguyen, N. C.; Bonet, J.; Peraire, J. A hybridizable discontinuous Galerkin method for both thin and 3D nonlinear elastic structures. *Comput. Methods Appl. Mech. Eng.* **2019**, doi:10.1016/J.CMA.2019.04.029.

3. Okereke, M. I.; Akpoyomare, A. I. A constitutive model for semi-crystalline polymers: A multiple viscoelastic relaxation processes implementation. In *Computational Plasticity*; CIMNE: Barcelona, 2017.

4. Lee, C. H.; Gil, A. J.; Greto, G.; Kulasegaram, S.; Bonet, J. A new Jameson–Schmidt–Turkel Smooth Particle Hydrodynamics algorithm for large strain explicit fast dynamics. *Comput. Methods Appl. Mech. Eng.* **2016**, *311*, 71–111, doi:10.1016/j.cma.2016.07.033.