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# NUMERICAL APPROACHES AND DISCRETIZATION TECHNIQUES FOR THE GEOMETRICALLY NONLINEAR ANALYSIS OF SLENDER STRUCTURES

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## MINISYMPOSIUM

Slender structures are used as primary components in a wide range of engineering applications. Their spread is further encouraged by the advent of new materials that enable the design of highly optimized shapes. In such structures, the mechanical response is driven by geometrical nonlinearities while the material may behave elastically and inelastically. Complex and highly nonlinear responses frequently characterizes their mechanical behaviour and imperfections can radically influence their stability. Consequently, developing numerical approaches that offer robustness, efficiency and accuracy in analyzing slender structures is a research topic of high interest in computational mechanics, involving modelling, discretization methods and nonlinear solvers. Based on these premises, this mini-symposium aims to bring together scientists worldwide working on advanced methods for the geometrically nonlinear analysis of structures used in civil, mechanical, marine, aerospace, and biomedical engineering applications.

Therefore, contributions may involve the following aspects

- Enhanced structural models for beam, shell and solid structures undergoing large deformations.
- Discretization methods as strong formulations (i.e., collocation and differential quadrature method, inverse differential quadrature method), weak formulations (i.e., finite element method, boundary element method, isogeometric analysis).
- Advanced computational methods to evaluate the stability behaviour of lightweight structures in statics
  and dynamics.
- Path-following strategies in statics and dynamics.
- Efficient and stable time integration schemes (implicit and explicit).
- Reduced order models.
- Nonlinear phenomena in coupled problems (e.g. magneto-electro-thermo-mechanical problems, fluid-
  structure interactions).
- Multi-level and multi-scale analysis of nonlinear structures.
- Numerical methods for the imperfection sensitivity analysis and reliable safety assessment.
- Structural optimization and control considering the nonlinear behaviour.