Computational Efficient Models for Non-Linear Inelastic Analysis of Building Frameworks

Motivation and objectives: Practical yet accurate computational models for advanced nonlinear inelastic analysis of frame structures subjected to static and dynamic actions are absolutely necessary to be developed in order to approach real-world structures in current analysis and design practice. In spite of the availability of some advanced nonlinear inelastic algorithms and powerful computer programs, the nonlinear inelastic analysis of real large-scale 3D frame structures, at ambient and high temperatures, still possess high demands on the most powerful computers available and still represents unpractical tasks to most designers. This special session aims at stimulating the exchange of knowledge and new perspectives on the development of computational efficient tools able to reveal with a high degree of accuracy but with less computational effort the main factors that affect the nonlinear inelastic behaviour of steel and composite steel-concrete frame structures subjected both to normal and extreme actions such as earthquakes and fire attacks. The session will host contributions that cover, but are not limited to, advanced computational models which allow explicit and efficient modelling of the combined effects of distributed plasticity, element geometrical effects, material and geometrical imperfections, complex nonlinear constitutive equations, prismatic or non-prismatic elements, local and lateral-torsional buckling, beam-to-column joint modelling and behaviour, flexural-shear interaction, etc., fulfilling the practical and advanced analysis requirements.