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DISCRETE MODELS FOR HETEROGENEOUS QUASIBRITTLE MATERIALS

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ABSTRACT

Civil engineering heavily relies on the use of porous heterogeneous quasi-brittle materials, such as concrete, masonry, wood, and rocks, which play crucial roles in various structural applications. The performance and durability of these materials are influenced by a complex interplay of mechanical behavior, mass transport, heat transfer, and chemical reactions coupled with the occurrence of cracks at the scale of material heterogeneity. Efficient, reliable and robust modeling approaches for these materials are needed.

The discrete models, in principle only an assembly of ideally rigid bodies interconnected by cohesive contacts, have demonstrated to supersede by far most of the other computational techniques for simulating heterogeneous quasi-brittle materials subject to fracture. They excel in applications where accurately capturing the internal structure of the material and understanding the interactions across different length scales are paramount. Today, they can offer an efficient means of representing multiscale and coupled multiphysics phenomena.

This mini-symposium will provide a forum for international experts and researchers to discuss recent advances in discrete modeling of heterogeneous quasibrittle materials. Topics of interest include, but are not limited to elasticity, fracture, creep, multiscale modeling, coupled formulations for mass transport, cracking, shrinkage, creep, healing, and deterioration, hydraulic fracturing, and theoretical and general advances in the field of discrete models.