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Non-standard discretization and multiscale modeling for structural elements

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Structural elements are most efficient in modeling large areas with a low number of degrees of freedom by reducing their geometrical dimensions like beam, plate, or shell theories. This reduction also introduces assumptions of the solution space either in thickness direction or for a whole cross-section. Associated with this, information about the distribution of the quantity of interest is lost. This leads to problems for non-linear material laws, performing mixed dimensional analysis in the sense of a transition from solid to structural elements, or solving multi-physical problems.

The first main topic of the minisymposium considers non-standard discretization methods, including isogeometric analysis, scaled boundary method, meshless methods, extended finite element method, particle finite element method and others.

The second main topic of this minisymposium considers multiscale modeling for structural elements with a focus on the recovery of information that is lost due to geometrical assumptions of the theories. Exemplary approaches are the FE^2 method or sub-structuring/mixed dimensional modeling. The first method allows the use of general material models within structural elements, while the second aims to combine structural and solid elements.

By this means, researchers who worked on numerical methods which recover structural response data are cordially invited to present their recent results.