

A serendipity fully discrete div-div complex on polygonal meshes

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Abstract

The well-posedness of certain physical models expressed in terms of partial differential equations relies on homological and algebraic properties of Hilbert complexes. In this talk, I will first introduce a fully discrete version of the two-dimensional div-div complex also referred to as the plates complex. This Hilbert complex underlying elasticity and first step towards addressing poromechanical flows is relevant for the mixed formulation of fourth-order problems. The derivation of the discrete sequence follows the discrete de Rham paradigm, leading to an arbitrary order construction on generic polygonal elements. I will then discuss the reduction of degrees of freedom using serendipity techniques in order to construct another discrete sequence with less degrees of freedom and preserving the homological properties.