DPG FOR REISSNER–MINDLIN PLATES, PART 2

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ABSTRACT

The challenge of finding proper DPG settings for thin structure models consists in two parts: deriving a uniformly stable variational formulation and dealing with locking phenomena. In [3], we presented a variational formulation for the Kirchhoff–Love plate bending model, the abstract limit case of the Reissner–Mindlin model. The results in [3] apply to all physically relevant boundary conditions, and include non-convex Lipschitz plates. In [5], we extended this setting to the Reissner–Mindlin case, thus achieving a uniformly (with respect to the plate thickness) stable formulation with resulting quasi-optimal DPG scheme. These results were presented at the previous meeting, 2019 in Berlin. The question of appropriate discretization spaces and transverse shear-locking was open in the case of non-smooth solutions. In this talk we present a new formulation [4] that is based on a Helmholtz decomposition of the shear force variable, a technique proposed by Brezzi, Fortin [2] and thoroughly analyzed by Arnold, Falk [1] for a mixed finite element scheme. Our DPG scheme is provably locking free for convex hard-clamped plates.

References

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