

Locking in Variations of the Mindlin-Reissner Plate Model

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The Mindlin–Reissner plate model is widely used for the elastic deformation simulation of moderately thick plates. Shear locking occurs in the case of thin plates, which means slow convergence with respect to the mesh size. The Kirchhoff plate model does not show locking effects, but is valid only for thin plates. One would like to have a method suitable for both thick and thin plates.

Different approaches are known to deal with the shear locking in the Mindlin–Reissner model. One possible way is a hierarchical deformation ansatz combining the Kirchhoff and Mindlin–Reissner models. We investigate several such hierarchical methods with respect to the severeness of locking and the performance of the preconditioned conjugate gradient method used to solve the resulting finite element system in our talk.

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