Superconvergence and postprocessing of MITC plate elements

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Joint work with

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ABSTRACT

A superconvergence result is proved for the approximation deflection in the MITC finite element method for the Reissner–Mindlin plate model [2, 3]. The deflection approximation is shown to be superconvergent with respect to a special interpolation operator that is closely related to the reduction operator used in the MITC method.

By utilizing the superconvergence property a postprocessing method to improve the deflection is introduced. In the postprocessing the new approximation for the deflection is constructed element by element which implies low computational costs.

The new approximation is a piecewise polynomial one degree higher than the original one. The improved accuracy of this approximation is proved as well as confirmed by numerical computations. The numerical tests also indicate that the vertex values of the original deflection approximation are superconvergent. In the numerical tests both uniform and non-uniform meshes are used and cases with different kinds of boundary conditions are studied.

REFERENCES

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