

Isogeometric block FETI-DP preconditioners for the Stokes and mixed linear elasticity systems

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ABSTRACT

We construct and analyze a FETI-DP type domain decomposition preconditioner for isogeometric discretizations of the Stokes and mixed linear elasticity systems. This method extends to the isogeometric analysis context [1] the preconditioner previously proposed by Tu and Li [2] for finite element discretizations of the Stokes system. The resulting isogeometric FETI-DP algorithm is proven to be scalable in the number of subdomains and has a quasi-optimal convergence rate bound which is polylogarithmic in the ratio of subdomain and element sizes. Several two-dimensional numerical experiments validate the theory, investigate the behavior of the preconditioner with respect to both the spline polynomial degree and regularity, and show its robustness with respect to domain deformation, material incompressibility and presence of elastic coefficient discontinuities across subdomain interfaces.

REFERENCES

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