EFFICIENT QUADRATURE-BASED PRECONDITIONERS FOR THE RIESZ OPERATOR

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In this talk, we present a comparative analysis of quadrature methods for approximating fractional operators, with a focus on error estimates and their effectiveness in preconditioning the Riesz operator. A first approach uses the Gauss-Jacobi quadrature to approximate this operator as a fractional power of a discretized Laplacian [1, 4]. Others, which achieve faster convergence, rely on Gauss-Laguerre and sinc rules [3, 5]. By appropriately selecting the number of quadrature points, both approaches yield accurate preconditioners that require only a few shifted Laplacian inverses. Numerical tests show that the sinc-based preconditioner is more versatile than the one based on the Gauss-Laguerre rule, and both outperform the Gauss-Jacobi approach [2].

References

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