A Nyström method for 2D Fredholm integral equations based on anti-Gaussian cubature formulae

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Fredholm integral equations defined on the square are considered and a numerical method of Nyström-type is proposed for their numerical solution. The method is based on Anti-Gauss cubature rules, proposed in [1] for the first time; see also [2] for the numerical implementation. The stability, convergence, and conditioning of the proposed Nyström-type method are studied in suitable weighted spaces. The numerical solution of the resulting dense linear system is also investigated and several numerical tests are presented.

References

[1] P. Díaz de Alba, L. Fermo, G. Rodriguez *Anti-Gauss cubature rules with applications to Fredholm integral equations on the square.*, SIAM Journal on Scientific Computing, 47 (2025), pp. A689–A712.

[2] P. Díaz de Alba, L. Fermo, G. Rodriguez *AGquad: a Matlab package for 1D and 2D anti-Gauss type rules*, Journal of Approximation Software, 2 (2025), article number 2.