


复旦大学数学科学学院
数学综合报告会

报告题目：Spherical configurations and quadrature methods for integral equations of the second kind

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时间：2025-10-11 星期六 14:00-15:00

地点：光华东主楼1704

报告摘要：

We propose and analyze a product integration method for the second-kind integral equation with weakly singular and continuous kernels on the unit sphere . We employ quadrature rules that satisfy the Marcinkiewicz--Zygmund property to construct hyperinterpolation for approximating the product of the continuous kernel and the solution, in terms of spherical harmonics. By leveraging this property, we significantly expand the family of candidate quadrature rules and establish a connection between the geometrical information of the quadrature points and the error analysis of the method. We then utilize product integral rules to evaluate the singular integral with the integrand being the product of the singular kernel and each spherical harmonic. We derive a practical error bound, which consists of two terms: one controlled by the best approximation of the product of the continuous kernel and the solution, and the other characterized by the Marcinkiewicz--Zygmund property and the best approximation polynomial of this product. Numerical examples validate our numerical analysis.

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