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QUADRATURE OF SINGULAR INTEGRANDS OVER SURFACES*

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Abstract. Consider integration over a simple closed smooth surface in $\mathbb{R}^3$, one that is homeomorphic to the unit sphere, and suppose the integrand has a point singularity. We propose a numerical integration method based on using transformations that lead to an integration problem over the unit sphere with an integrand that is much smoother. At this point, the trapezoidal rule is applied to the spherical coordinate representation of the problem. The method is simple to apply and it results in rapid convergence. The intended application is to the evaluation of boundary integrals arising in boundary integral equation methods in potential theory and the radiosity equation.

Key words. spherical integration, singular integrand, boundary integral, trapezoidal rule.

AMS subject classifications. 65D32, 65B15.

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