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SPHERICAL QUADRATURE FORMULAS WITH EQUALLY SPACED NODES ON LATITUDINAL CIRCLES*

DANIELA ROŞCA†

Abstract. In a previous paper, we constructed quadrature formulas based on some fundamental systems of $(n+1)^2$ points on the sphere ($n+1$ equally spaced points taken on $n+1$ latitudinal circles), constructed by Laín-Fernández. These quadrature formulas are of interpolatory type. Therefore the degree of exactness is at least n. In some particular cases the exactness can be $n+1$ and this exactness is the maximal that can be obtained, based on the above mentioned fundamental system of points. In this paper we try to improve the exactness by taking more equally spaced points at each latitude and equal weights for each latitude. We study the maximal degree of exactness which can be attained with $n+1$ latitudes. As a particular case, we study the maximal exactness of the spherical designs with equally spaced points at each latitude. Of course, all of these quadratures are no longer interpolatory.

Key words. quadrature formulas, spherical functions, Legendre polynomials

AMS subject classifications. 65D32, 43A90, 42C10

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†Dept. of Mathematics, Technical University of Cluj-Napoca, str. Daicoviciu nr. 15, RO-400020 Cluj-Napoca, Romania (Daniela.Rosca@math.utcluj.ro).