# QUADRATURE-FREE QUASI-INTERPOLATION ON THE SPHERE[*]

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*Dedicated to Ed Saff on the occasion of his 60th birthday*

**Abstract.** We construct certain quasi-interpolatory operators for approximation of functions on the sphere, using tensor product scattered data satisfying certain symmetry conditions. Our operators are constructed without using any quadrature formulas. We use instead a special class of orthonormal bivariate trigonometric polynomials. These polynomials are functions on the sphere, and are constructed in a numerically stable way, based on the data locations. The quasi-interpolatory operators give near best approximation to every continuous function.

We demonstrate our constructions numerically with several benchmark functions using randomly generated data locations.

**Key words.** function approximation on the sphere, scattered data, quasi-interpolation, Jacobi matrices

**AMS subject classifications.** 42A15, 65D32, 33C55