# Smooth approximation and interpolation of scattered data on the sphere with linear precision by quadrangulations

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The problem of interpolation on the sphere arises in the study of many physical phenomena, such as temperature, rainfall, pressure, ozone distribution or gravitational forces, measured at scattered points on the earth surface. A comprehensive survey on various approaches to solve this problem has been provided by G.E. Fasshauer and L.L. Schumaker in 1998 [5]. Later, in 2010, R. Cavoretto and A. De Rossi proposed an approach which involves a modified spherical Shepard's interpolant and zonal basis functions as local approximants [1]. In line with previous studies [2, 3, 4], in this talk we discuss a new approach based on quadrangular Shepard basis functions on the sphere combined with linear interpolants at quadrangulations of the scattered points. In particular, the basis functions are the normalization of the product of the inverse geodesic distance to the vertices of the quadrangulation while the linear interpolants are defined by spherical polynomials [6]. The resulting operator reproduces linear polynomials on the sphere and interpolates the given data. Numerical experiments on variuos sets of scattered points demonstrate the effectiveness of the approximation.

## References

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