



Comparison of several approximation schemes on the Cubed Sphere

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Approximation, interpolation and quadrature are questions of fundamental importance for atmospheric and oceanic problems at planetary scale.

Computation with spherical harmonics on the sphere is an old mathematical topic; it has a particular interest in geosciences, and is still an active field of research. In this poster, we will show numerical comparisons of several approximation schemes, with a special focus on the Cubed Sphere grid. We test hyperinterpolation, weighted least squares, and interpolation on a series of test functions with various smoothness properties. Our last results include the derivation of explicit formulas for optimal quadrature rules on low resolution Cubed Spheres.

[1] J.-B. Bellet, M. Brachet, and J.-P. Croisille, Interpolation on the Cubed Sphere with Spherical Harmonics, *Numerische Mathematik*, 153 (2023), pp. 249-278.

[2] J.-B. Bellet and J.-P. Croisille, Least Squares Spherical Harmonics Approximation on the Cubed Sphere, *Journal of Computational and Applied Mathematics*, 429 (2023), 115213.

[3] C. An and H.-N. Wu, Bypassing the quadrature exactness assumption of hyperinterpolation on the sphere, *Journal of Complexity*, 80 (2024), 101789.