

APPLIED MATHEMATICS COLLOQUIUM

“Computing with Functions on the Sphere Using Low Rank Approximations”

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Abstract: A collection of algorithms for computing with functions on the surface of the unit two-sphere is presented. Central to these algorithms is a new scheme for approximating functions to essentially machine precision by using a structure-preserving iterative variant of Gaussian elimination together with the double Fourier sphere method. The scheme gives a low rank representation of the approximants that reduces oversampling issues near the poles, converges for certain analytic functions, and allows for stable differentiation. The low rank representation also makes operations such as function evaluation, differentiation, and integration particularly efficient. A highlight is an optimal complexity spectral method for Poisson's equation on the sphere. A short demonstration of the algorithms, which are implemented in Chebfun, will be given.

**Monday December 7, 2015
4:30PM
Room E17-122**

Applied Math Colloquium: <http://www-math.mit.edu/amc/fall15/>
Math Department: <http://www-math.mit.edu>

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