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The Hong Kong University of Science and Technology

Department of Mathematics

Seminar on Applied Mathematics

A quick numerical trip to spherical t -designs

by

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Abstract

We draw our attention on the unit sphere in three dimensional Euclidean space. A set X_N of N points on the unit sphere is a spherical t -design if the average value of any polynomial of degree at most t over X_N is equal to the average value of the polynomial over the sphere. The last forty years have witnessed prosperous developments in theory and applications of spherical t -designs. Let integer $t > 0$ be given. The most important question is how to construct a spherical t -design by minimal N . It is commonly conjectured that $N = \frac{1}{2}t^2 + o(t^2)$ point exists, but there is no proof. In this talk, we firstly review recent results on numerical construction of spherical t -designs by various of methods: nonlinear equations/interval analysis, variational characterization, nonlinear least squares, optimization on Riemannian manifolds. Consequently, numerical approximation to singular integral over the sphere by using well-conditioned spherical t -designs are also discussed.

Date: Tuesday, 26 September 2017

Time: 2:00p.m. – 3:00p.m.

***Venue: Room 5506, Academic Building
(near Lifts 25 & 26), HKUST***

All are welcome!