

THE UNIVERSITY



OF HONG KONG

Department of Mathematics

COLLOQUIUM

Well conditioned spherical t -design and its application in numerical integration

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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. Secondly, numerical construction of well-conditioned spherical t -designs are introduced for N is the dimension of the polynomial space. Consequently, numerical approximation to singular integral over the sphere by using well-conditioned spherical t -designs are also discussed.

Date: May 11, 2018 (Friday)

Time: 5:00 - 6:00pm

Venue: Room 210, Run Run Shaw Bldg., HKU

All are welcome