THE DEPARTMENT OF MATHEMATICAL SCIENCES

Indiana University - Purdue University Fort Wayne

is pleased to present

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Universal Lower Bounds on Energy — Computational Aspects

Abstract

Let $\mathbb{S}^{n-1}$ be the unit sphere in $\mathbb{R}^n$. We refer to a finite set $C \subset \mathbb{S}^{n-1}$ as a *spherical code* and, for a given (extended real-valued) function $h(t) : [-1, 1] \to [0, +\infty]$, we consider the *h-energy* (or the potential energy) of C defined by

$$E(n, C; h) := \sum_{x, y \in C, x \neq y} h(\langle x, y \rangle), \tag{1}$$

where $\langle x, y \rangle$ denotes the inner product of x and y.

A commonly arising problem is to estimate the potential energy provided the cardinality $|C|$ of C is fixed, that is, to determine

$$\mathcal{E}(n, N; h) := \inf\{E(C; h) : |C| = N, C \subset S^{n-1}\}$$

In this talk we address some computational aspects in connection with recently obtained universal lower bound on $\mathcal{E}(n, N; h)$ – decision making, generating necessary parameters, deriving bounds, test functions and (if possible) further improvements.

Joint work with: Peter G. Boyvalenkov, Peter Dragnev, Douglas Hardin, Edward Saff.

Noon – 1:00, Wednesday, March 18, 2015. Location: KT 216

http://ipfw.edu/departments/coas/depts/math/news/seminars.html