Liu Bie Ju Centre for Mathematical Sciences
City University of Hong Kong

Mathematical Analysis and its Applications Colloquium

Organized by Prof. Hui-Hui Dai and Dr. Dan Dai

Recent Results on Nonnegative Trigonometric Polynomials

by

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Date : **October 06, 2016 (Thursday)**
Time : **5:00 pm to 6:00 pm**
Venue : **Room B5-211 (Lift 8)**
Blue Zone, Level 5, Academic 1 (AC1)
City University of Hong Kong

ABSTRACT:

In 1910, L. Fejer conjectured that

$$\sin(x) + \frac{\sin(2x)}{2} + \frac{\sin(3x)}{3} + \cdots + \frac{\sin(nx)}{n}$$

is nonnegative on $[0, \pi]$ for any positive integer n. These are partial sums of a certain Fourier series. It was proved by D. Jackson the follow year, and independently by T.H. Gronwall another year later. W.H. Young showed that an analogous result was true for the cosine polynomial

$$1 + \cos(x) + \frac{\cos(2x)}{2} + \frac{\cos(3x)}{3} + \cdots + \frac{\cos(nx)}{n}.$$

Since then many examples of nonnegative trigonometric polynomial have been constructed. Applications of these results are plenty, including Fourier analysis, geometric function theory, approximation, image processing, and even the Bieberbach conjecture. Contributors include Askey, Brown, Koumandos, Szego, Turan, ...

One of the most general results on polynomials with monotone coefficients is due to L. Vietoris (1958), extended further by A.S. Belov (1995). The talk will survey some recent results, including an extension of Vietoris' sine inequalities to polynomials with non-monotone and non-decreasing coefficients.

A majority of the work is joint with H. Alzer.

Light refreshments will be provided before the colloquium from 4:30 pm to 5:00 pm. Please come and join us!

** All interested are welcome **

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