

PolyU 75th Anniversary Special

The AMSS-PolyU Joint Research Institute
Distinguished Lecture

How Chebfun Solves ODEs and Eigenvalue Problems By Prof. Nick Trefethen, Oxford University



Abstract

Chebfun has become a remarkably powerful tool for solving differential equations and eigenvalue problems in one dimension. This talk will describe some of the algorithms that make this possible, which are mainly due to Asgeir Birkisson, Toby Driscoll, and Nick Hale. In particular, we will focus on the following issues:

- The "happiness iteration" underlying Chebfun adaptivity
- Rectangular spectral collocation discretizations
- How EIGS selects its eigenfunctions
- Frechet derivative operators for nonlinear problems via AD
- The graphical user interface CHEBGUI

Biography

Nick Trefethen is Professor of Numerical Analysis and head of the Numerical Analysis Group at Oxford University. He was educated at Harvard and Stanford and held professorial positions at NYU, MIT, and Cornell before coming to Oxford in 1997. He is a Fellow of the Royal Society and a member of the US National Academy of Engineering.

As an author he is known for his books Numerical Linear Algebra (1997), Spectral Methods in MATLAB (2000), Schwarz-Christoffel Mapping (2002), and Spectra and Pseudospectra (2005). He is an ISI Highly Cited Researcher, with about 100 journal publications in numerical analysis and applied mathematics, and has served as editor for many of the leading numerical analysis journals. He has lectured in about 15 countries and 25 American states, including invited lectures at both ICM and ICIAM congresses.

Some of Trefethen's recent activities include the SIAM 100-Dollar, 100-Digit Challenge, the notion of Ten Digit Algorithms ("ten digits, five seconds, and just one page"), the Chebfun software system for numerical computation with functions instead of numbers, and a book in preparation called Approximation Theory and Approximation Practice. During 2011-2012 he is serving as President of SIAM.

ALL ARE WELCOME!

Date : 29 May 2012 (Tue)

Time : 3:00pm - 4:00 pm (Tea reception at 4:15pm)

Venue : M1603, Senate Room,
Li Ka Shing Tower, PolyU

For enquiry, please contact Miss Eunice Hung at 3400 3908 or maehung@inet.polyu.edu.hk