

APPLIED MATHEMATICS COLLOQUIUM

CHEBFUN AND CHEBOP

Professor Lloyd N. Trefethen
Oxford University

ABSTRACT:

For a long time there have been two kinds of mathematical computation: symbolic and numerical. Symbolic computing manipulates algebraic expressions exactly, but it is unworkable for many applications since the space and time requirements tend to grow combinatorially. Numerical computing avoids the combinatorial explosion by rounding to 16 digits at each step, but it works just with individual numbers, not algebraic expressions.

This talk will describe a new kind of computing that aims to combine the feel of symbolics with the speed of numerics. The idea is to represent functions by Chebyshev expansions whose length is determined adaptively to maintain an accuracy of close to machine precision. The chebfun system is implemented in object-oriented Matlab, with familiar vector operations such as sum and diff being overloaded to analogues for functions such as integration and differentiation. A further overload gives the chebop system for solving differential equations. All this is joint work with Zachary Battles, Folkmar Bornemann, Ricardo Pachon, Rodrigo Platte, and Toby Driscoll.

MONDAY DECEMBER 15TH 2008

4:30 PM

Building 4, Room 231

*Refreshments at 4:00 PM in Building 2, Room 349
(Applied Math Common Room)*

Applied Math Colloquium: <http://www-math.mit.edu/amc/fall08>
Math Department: <http://www-math.mit.edu>



Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139