Numerical Approximation Theory

Spring 2013, Math 6645

Class information

- Class: Monday, Wednesday and Friday 1:05PM - 1:55PM
- Instructor : Sung Ha Kang
    - Email: kang at math.gatech.edu
    - Office hours: Wednesday 10-11AM and Friday 11-noon or by appointment

General course information

- Prerequisites: Math 4317 and Math 4640 (or equivalent)
- Course Description : Theoretical and computational aspects of polynomial, rational, trigonometric, spline and wavelet approximation.
- Tentative course outline
    - Polynomial Approximations: Classical polynomial interpolation, Chebyshev, Spline, Least squares approximation
    - Trigonometric Polynomial Approximation: Fourier series and the FFT, transformation and their application
    - Introduction to Wavelet approximation
    - Spectral methods or Level set method

Some References

1. (Review material) Numerical Analysis Mathematics of Scientific Computing (3rd) by Kincaid and Cheney, Brooks/Cole. (on Reserve)
2. Spectral methods in matlab by Lloyd N. Trefethen, SIAM Link
3. Spectral Methods for Time-Dependent Problems (Cambridge Monographs on Applied and Computational Mathematics) by Jan Hesthaven, Sigal Gottlieb and David Gottlieb, Cambridge. (on Reserve)
4. Numerical Analysis of Spectral Methods: Theory and Applications, by David Gottlieb and Steven A. Orszag, SIAM Link
5. Nodal discontinuous Galerkin methods : algorithms, analysis, and applications, by Jan Hesthaven and Tim Warburton, SpringerLink
6. A Basis Theory Primer by Christopher Heil, Birkhauser Link.
7. (more maybe added)

Course Grade

- Students are strongly encouraged to solve all the homework problems. Exams will be based on these homework problems. The handed-in homework grade will be added to the exam score, 5% additional each to exam 1 and exam 2.
- Two Exams (30% each): There will be two exams during the semester. No Make-up exams. In case of serious illness, doctor's note is required, and for an excused absences, at least two weeks prior notice required.
- Final or Presentation (40%): If a student gives a presentation on the material related this course material, he/she is exempted from Final. The topic of the presentation can be related to student's research or on a paper related to topic of this class. This decision should be made and consulted with me by March 15st.

HONOR CODE: All students are expected to comply with the Georgia Tech Honor code. Please review the student code of conduct.