

高等工程數學數值方法

Advanced Numerical Methods for Engineering Scientists

課程大綱：

1. Fast Fourier Transform: Operation count and data structure.
2. Stiff Problems for Ordinary Differential Equation: Implicit method and stability analysis.
3. Grams-Schmidt Method and Its Application: QR decomposition for linear system.
4. Tri-diagonal form and Hessenberg Forms: Inverse iteration and QR algorithm for solving eigenvalue problem.
5. Iterative Methods for Solving Linear Systems: Success over relaxation (SOR), Conjugate Gradient (CG), Multigrid Method (MG).
6. Methods for Signal Processing: Wavelet analysis and Hilbert Huang Transform.

Course grades will depend on:

1. Biweekly homework assignment (30%).
2. One mid-exam (40%) and final term report (30%).

References:

1. Numerical Recipes 3rd Edition: The Art of Scientific Computing by William H. Press, Saul A. Teukolsky, William T. Vetterling, and Brian P. Flannery (Hardcover - Sep 10, 2007)
2. Numerical Linear Algebra by Lloyd N. Trefethen and David Bau III (Paperback - Jun 1, 1997)
3. Numerical Analysis: Mathematics of Scientific Computing by David R. Kincaid and E. Ward Cheney (Hardcover - Oct 25, 2001)

