Course 261
Numerical Analysis

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http://www.maths.tcd.ie/teaching.261.html

Course Description

Numerical Linear Algebra:

Gaussian elimination and Gauss-Jordan elimination; LU decomposition; SVD and sparse matrix methods; Stability and error analysis; Iterative solutions including Krylov subspace techniques.

Interpolation and Extrapolation

Polynomial and rational interpolation and extrapolation; Cubic spline interpolation; Interpolating in 2+ dimensions.

Numerical Integration:

Integration of functions, ODEs and PDEs; Introduction to path integrals.

Evaluation of Functions

Series and convergence; Polynomial and rational functions; Chebyshev and Padé approximations.

Statisical description and Modeling of Data

Moments of a distribution - mean, variance etc; Comparing two distributions; Correlations in datasets; Fitting data to a straight line; Fitting data with errors in x and y coordinates; Bootstrapping and Monte Carlo Methods.