

First level degree in Chemical Engineering

Faculty of Engineering of Industrial Processes

APPLIED NUMERICAL ANALYSIS

prof. Davide Manca

credits: 5

Brief description of the subjects

Numerical analysis and the computer. Error theory: absolute and relative error. Conditioning of a numerical problem. Error propagation. Floating point representation of numbers. Stability of a method. Linear systems: Gauss elimination and Gauss factorization. Pivoting strategies. Direct and iterative methods. Polynomial interpolation. Lagrange and Newton methods. Cubic splines. Rational interpolation and Hermite polynomials. Rootfinding. Bisection method. Newton, Secant and Regula falsi methods. Aitken extrapolation. Monodimensional optimization. Objective function and degrees of freedom. Fibonacci and golden section methods. Parabolic interpolation. Robustness and efficiency. Integration. Trapezoid and Cavalieri-Simpson formula. Gauss formula.

Course structure and examination

Lessons + Numerical practical + Numerical laboratory

Final written exam + oral exam

Suggested literature

Atkinson K. E., "Elementary Numerical Analysis", John Wiley & Sons, (1993)

Buzzi Ferraris G., "Metodi numerici e Software in C++", Addison Wesley, (1998)

Comincioli V., "Analisi numerica. Metodi Modelli Applicazioni", McGraw-Hill, (1990)