Numerical Methods for Differential Equations (recommended subject)

Numerical Methods for Ordinary Differential Equations

General one-step methods. Explicit and implicit Runge-Kutta methods

Linear multistep methods. Adams-Bashforth and Adams-Moulton methods

Predictor-corrector methods. Solving stiff equations

Numerical Methods for Partial Differential Equations

Classification of linear partial differential equations, the three basic types

Finite difference methods. The relation between convergence and stability

The finite element method. The Ritz-Galerkin method. Choosing the basis functions

References

- *J. Stoer - R. Bulirsch:* Introduction to Numerical Analysis. Springer Verlag, New York, 1980.
- *E. Hairer et al.:* Solving Ordinary Differential Equations. Vol. I, Springer Verlag, Berlin, 1987. Vol. II, Springer Verlag, Berlin, 1991.
- *R. J. LeVeque*: Finite Difference Methods for Ordinary and Partial Differential Equations, SIAM, Philadelphia, 2007.
- *K.-J. Bathe*: Finite Element Procedures, Prentice Hall, Pearson Education, 2014.