

COURSE MATERIAL, DN1240, NUMFCL10

The course uses the chapters listed below from a draft of the e-book "Body and Soul, Mathematical Simulation Technology", by Johan Jansson and Claes Johnson. The module texts make reference only to these chapters.

- Newton's Laws of Motion (ch. 17)
- Particle-Spring System (ch. 18)
- Planetary system (ch. 19)
- Particle-Spring Systems (ch. 39)
- Elastic string - equivalence of mass-spring discretization and wave equation (ch. 45-47)
- The Fundamental Theorem of Calculus (ch. 63)
- Proof of the Fundamental Theorem (ch. 75)
- Contraction Mapping (ch. 76)
- Newton's method (ch. 77)
- Generalized Fundamental Theorem (ch. 78)
- Stability of solutions to $\dot{u} = f(u)$ (ch. 80)
- Time Stepping Error Analysis (ch. 82)
- Solving Linear Algebraic Systems (ch. 94)
- Piecewise linear interpolation (ch. 119)
- Quadrature (ch. 120)
- FEM/PDE/Boundary conditions (ch. 149-159)

The chapters forming the basis for module 1-5 can be found in the following [excerpt](#).

The rest of the chapters (45-47,149-159) can be found in [Body and Soul, Mathematical Simulation Technology](#) by Johan Jansson and Claes Johnson.