Second Semester Area B (continuous)

CSE 383L/M 387D, Numerical Analysis: Differential Equations

1. ODE's/Initial Value Problems

1.1. Finite differences
1.2. Stability and convergence
1.3. Stiff and symplectic integrators
1.4. Stochastic Differential Equations (SDE's)

2. ODE's/Boundary Value Problems

2.1. Finite differences
2.2. Finite elements
2.3. Initial value methods

3. PDE's/Elliptic Equations

3.1. Finite elements
3.2. Discontinuous Galerkin
3.3. A priori and a posteriori error estimates

4. PDE's/Initial Value Problems

4.1. Finite elements
4.2. Finite differences
4.3. Finite volumes
4.4. Discontinuous Galerkin
4.5. Spectral methods
4.6. Stability and convergence
4.7. Nonlinear conservation laws/shocks and entropy