

NUMERICAL METHODS - APPLICATIONS TO GEOPHYSICAL FLUIDS

- Introduction, Background knowledge
- Finite difference approximation to derivatives, numerical schemes, errors
- Nonlinear equations, methods for solution (Bisection, Interpolation, Newton, Iteration)
- Nonlinear equations, convergence and stability
- Numerical solution of integral equations
- Numerical solution of differential equations
- Ordinary differential equations (I): Methods (Euler, Rung – Kutta)
- Ordinary differential equations (II): Convergence and stability, Error propagation
- Parabolic Partial Differential Equation (PDE) (I): Heat transfer equation
- Parabolic PDE (II): Convergence and stability, Error propagation, Boundary value problems
- Elliptic PDE (I): Steady State Heat Transfer Equation (Laplace & Poisson)
- Elliptic PDE (II): Convergence and stability, Error propagation, Boundary value problems
- Software applications (development of numerical algorithms): Diffusion, Heat transfer, and Wave equations