1. Dynamic programming and HJB equations
   - Bellman’s principle of optimality
   - The HJB equation
   - Properties of the value function (continuous dependence on parameters, semiconcavity)
   - Viscosity solutions
2. Verification theorems
   - Smooth case
   - Nonsmooth case
   - Merton’s portfolio problem
3. Filtering theory
   - The Kalman-Bucy filter
   - Nonlinear filtering for SDEs (the Kallianpur-Striebel formula, the Zakai equation)
4. Linear quadratic optimal control problems
   - Solutions for finite time and time-average cost
   - Stochastic Riccati equations
   - Existence

Viscosity Solutions
1. The notion of viscosity solutions
2. The maximum principle for semicontinuous functions and comparison for the Dirichlet problem
3. Perron’s method and existence
4. Comparison
   - Comparison with more regularity
   - Estimates from comparison
   - Comparison with strict inequalities and without coercivity in \( u \)
   - Comparison and existence of unbounded solutions on unbounded domains
5. Limits of viscosity solutions
6. General and generalized boundary conditions
   - Boundary conditions in the viscosity sense
   - Existence and uniqueness for the Neumann problem
   - The generalized Dirichlet problem
   - Fully nonlinear boundary conditions
References


