Math 454 - Spring 2025 - Homework 15

Published: Saturday, April 26, 2025

Status - Reading Assignments:

Here are the reading assignments to be completed before the first one of this HW.

SCF2 (Shreve – Stoch. Calculus for Finance, II Textbook):
  Ch. 1 – 6.

MF454 lecture notes:
  Ch.2 – ch.15.3

Other:
  Stewart Single Variable Calculus ch.3.9 (Antiderivatives) for examples of (ordinary) differential equations.

New reading assignments:

In the following: • MF = MF454 = my course lecture notes • SCF2 = Shreve: Stochastic Calculus for Finance II

• WMS = Wackerly, et al = standard Math 447 Textbook

Reading assignment 1 - due Monday, April 28:

- You are encouraged to read the (optional) chapter 15.4.

Reading assignment 2 - due: Wednesday, April 30:

- Study for the final exam! ⊡ Itô calculus ⊡ BAM and Black–Scholes markets ⊡ risk–neutral validation ⊡ conditional expectations ⊡ martingales, Markov processes, Brownian motion ⊡ SDEs – Feynman–Kac as a tool to express solutions of (deterministic) PDEs by stochastic methods ⊡ disproportionate focus on the chapters beyond the scope of midterm 3

Reading assignment 3 - due Friday, May 2:

- Study for the final exam!

Written assignments:

Written assignment 1:

- Write from memory the definitions and theorems of ch.14 and 15.
- Work through the Feynman–Kac examples in SCF2: SCF2 Example 6.4.4 (Options on a geometric Brownian motion) and the interest rate models of SCF2 Chapter 6.5
- Work through the proof of Proposition 15.2 (Asian options) as an application of the 2–dim Feynman–Kac.