Math 454 - Spring 2025 - Homework 11

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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 – 4

MF454 lecture notes:
Ch.2 – 13.3

Other:
Nothing assigned yet

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, August 31:

- **a.** Review Stewart Single Variable Calculus ch.3.9 (Antiderivatives) for examples of (ordinary) differential equations.
  Understand why the solution of $y' = ay$ ($a =$ const) is $y(x) = c \cdot e^{ax}$.
- **b.** Carefully read MF ch.13.4. It is not important for this course that you remember or even understand the extensive calculations (though it may be for a quant interview), but you should understand and remember that the BSM function of Theorem 13.2 (which you already encountered in Theorem 10.1) is the risk–neutral validation formula for a European call. See formula (13.29) of Lemma 13.2.
- **c.** Carefully read MF ch.13.5. Understand the financial modelling significance of Assumpion 13.3: Stock price is influenced by Brownian motion (since $dS_t = \alpha_t S_t dt + \sigma_t S_t dW_t$), but no other external info is permitted (since we now also demand that $\mathfrak{F}_t = \mathfrak{F}_t^W$).

Reading assignment 2 - due: Wednesday, April 2:

- **a.** Carefully read MF ch.13.6 through Remark 13.9. The stuff on correlation is computationally very simple.

Reading assignment 3 - due Friday, April 4:

- **a.** Carefully read the remainder of MF ch.13.6. This is not an easy read.
- **b.** xx

Written assignments are on the next page.

Written assignments:
Will follow later.