MF795: Assignment №6

Due on Thursday, December 10, 2020

POSTED ON: NOVEMBER 15, 2020, 12:03 (P)

Do the following exercises from the book:

Exercise (13.9), Exercise (13.12), Exercise (13.13), Exercise (13.18), Exercise (13.19),

Exercise (13.20), Exercise (13.24), Exercise (14.9), Exercise (14.11), Exercise (14.13),

Exercise (14.16), Exercise (14.17), Exercise (14.23), Exercise (14.24), Exercise (14.28),

Exercise (14.29), Exercise (14.30), Exercise (14.33), Exercise (14.35).

Optional Exercise: Consider an European-style stock option which is issued at time $t = 0$ and matures at time $t = T > 0$. The option has no intermediate payoff and its final payoff at time T is given by $\Phi_T = (S_T - K)^2$, for a given "strike" $K > 0$. Suppose that the underlying stock price S follows a geometric Brownian motion with dynamics (this is the standard Black-Scholes-Merton framework)

$$S = S_0 + \sigma S \cdot W + bS \cdot \iota$$

in which $b, \sigma \in \mathbb{R}$ are given parameters. The risk-free rate $r > 0$ is forever fixed, the underlying stock pays no dividends, and the market is complete. Calculate the price of this option at the time of issue ($t = 0$) as a function of the parameters in the model and the initial stock price S_0. Find a replicating trading strategy for this stock option.

PLEASE NOTE: Your assignment will not be accepted without a completed cover sheet. While typing the assignments is not required, it would be very beneficial for you if you do typeset your homework by using any of the widely available programs for technical typesetting: Google Docs, MS Word, TEX or LATEX (the industry standard). *Irrespective of how your document is created, your submission will not be accepted unless it is in PDF format!*