Assignment #5
Due Friday, November 6

1. We consider a market with one risky asset S and a riskless asset B

$$\begin{aligned} dS &= (m - S)\, dt + \sigma dW \\ dB &= rdt \end{aligned}$$

where m, σ, r are positive constants. Let C be a European call on S, with exercise price K and exercise time T, Evaluate numerically its price C_0, using

$$\begin{aligned} m &= 6,\ \sigma = .1,\ r = 3 \\ S_0 &= 7,\ K = 6,\ \ T = 1, 10,\ 100 \end{aligned}$$

2. In the same market, we consider the terminal-wealth problem:

$$\begin{array}{c} \max E_P \left[u\left(\tilde{X}_t B_t \right) \right] \\ d\tilde{X}_t = h_t d\tilde{S}_t \\ X_0 = x \end{array} \tag{1}$$

with $u(x) = -e^{-x}$. Compute the optimal value.