2024.01.12

1. $E[X_t] = (x-2)e^{-t} + 2$

2. $u(t,x) = 3e^{-2(T-t)}x + e^{-4(T-t)}\cos x$

3. $s\,N\left(\frac{\ln\frac{s}{K} + (r + \frac{\sigma^2}{2})T}{\sigma\sqrt{T}}\right)$

5. Put-call parity: $p(T,K) = Ke^{-rT} - s(1-\delta) + c(T,K)$

6. At $t=0$: Buy 1 share of S
   Buy the T-claim X.
   Sell 2 call options with strike 50
   Sell a zero-coupon T-bond (face value 100)

7 a) At $t=0$: Buy $\frac{1+e^{-r(T-T_1)}}{2}$ shares of S

   At $t=T$: Sell $\frac{1}{2}e^{-r(T-T_1)}$ shares of S and deposit $\frac{1}{2}e^{-r(T-T_1)}S_{T_1}$ in a bank account.

b) $\frac{1}{2}\left(1+e^{-r(T-T_1)}\right)s$

c) $\frac{1}{2}S_t + \frac{1}{2}S_{T_1}e^{-r(T-t)}$

8. $p(0,T) = \exp\left\{\int_0^T \frac{\sigma^2(t)}{2}(T-t)^2 dt - \frac{bT^2}{2} - rT\right\}$