



Extraopgave2 Inleiding Financiële Wiskunde, 2010

Consider a 2-period binomial model with $S_0 = 10$, $u = 1.25$, $d = 0.75$, and $r = 0.2$. Consider an American Put option with expiration $N = 2$ and strike price $K = 11$.

- (a) Determine the price V_n at time $n = 0, 1$ of the American put option.
- (b) Determine the optimal exercise time $\tau^*(\omega_1\omega_2)$ for all $\omega_1\omega_2$.
- (c) Suppose $\omega_1\omega_2 = HT$, find the values of the portfolio process $\Delta_0, \Delta_1(H)$ and the corresponding values of the wealth process X_0 and $X_1(H)$. Check that $X_2(HT) = V_2(HT)$.
- (d) Suppose $\omega_1\omega_2 = TT$. find the values of the portfolio process $\Delta_0, \Delta_1(T)$. Show that if the buyer exercises at time 1, then $X_1(T) = 3.5$, and if the buyer exercises at time 2, then $X_2(TT) = 5.375$.
- (e) Consider now an American Call option with expiration $N = 2$ and strike price $K = 11$. Determine the price V_n at time $n = 0, 1$ of the American Call option. Find the optimal exercise time $\tau^*(\omega_1\omega_2)$ for all $\omega_1\omega_2$.