Chapter 3 exercises

1. Implement code to price, in a binomial lattice, a European and an American option with the payoff at exercise time t of

$$\max(0, K - S(t)^{\alpha})$$

for an underlying asset $S(t)$, strike K and $\alpha > 0$.

2. Implement code to price, in a binomial lattice, a down–and–out call option where the holder receives a "rebate" of x if and when the option is knocked out.

3. Implement code to price, in a binomial lattice, an American up–and–out put option.

4. Adapt the binomial lattice code in this chapter to simultaneously price several contingent payoffs in a single roll–back operation on the lattice.

5. Construct a binomial lattice model with $n \cdot k$ time steps. Suppose that in a hedge of an option, the hedger is only permitted to rebalance the hedge every k time steps. Use the binomial lattice model to generate the profit/loss distribution resulting from this hedging strategy. (Assume that when rebalancing the hedge, any additional funds required are borrowed and any surplus funds are invested, at the risk–free rate.)

6. Implement C++ code to price a Bermudan swaption (a swaption which can be exercised early at one time point from a given set of time points) in the Sandmann/Sondermann binomial term structure model.