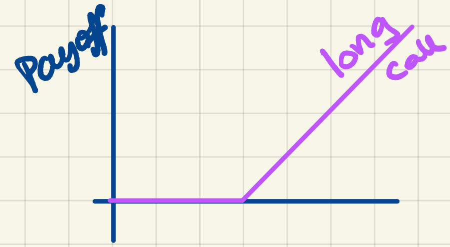
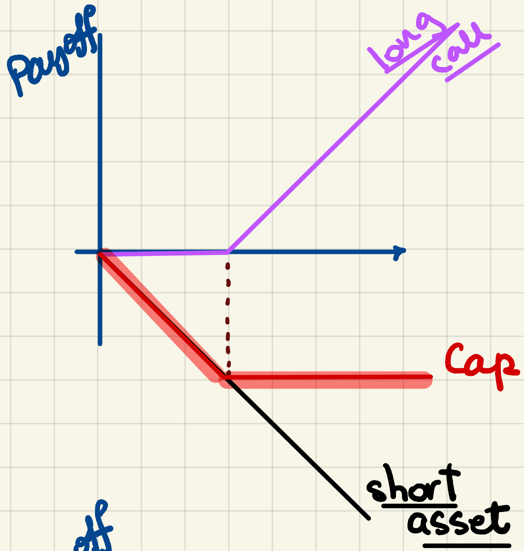
Calls, Puts & Related Positions.

M339D: February 28th, 2024.

Call



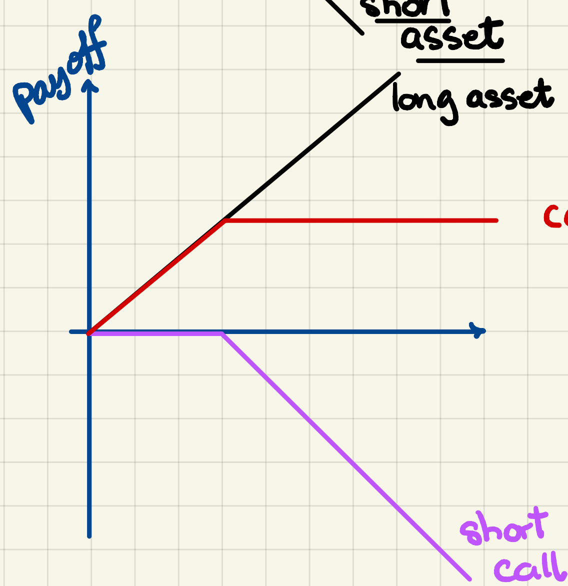
Cap



$\left.\begin{array}{l}\text{short asset}\\ \text{long call}\end{array}\right\}$ cap

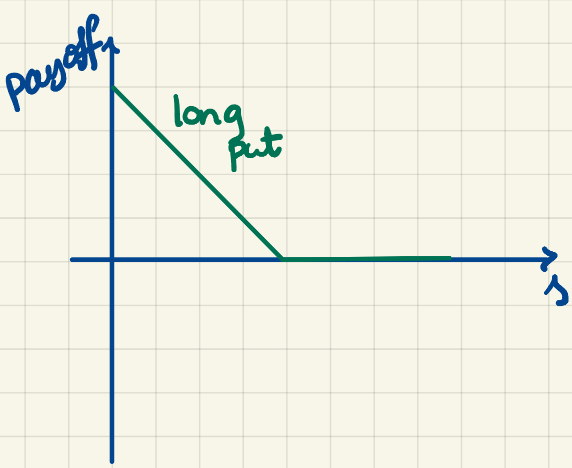
$\boxed{-\min(s,K)}$ ✓

Covered Call

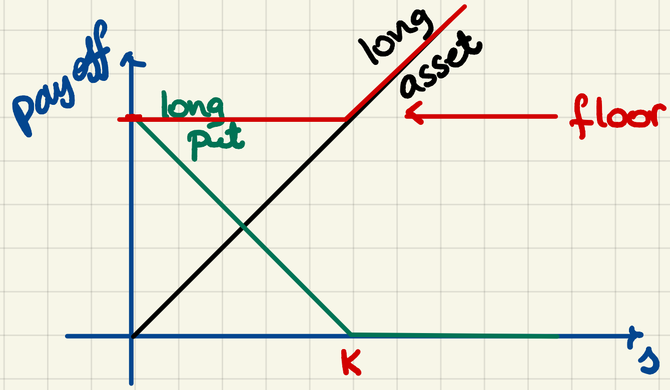


covered call $\left\{\begin{array}{l}\text{written call}\\ \text{long asset}\end{array}\right.$

Put

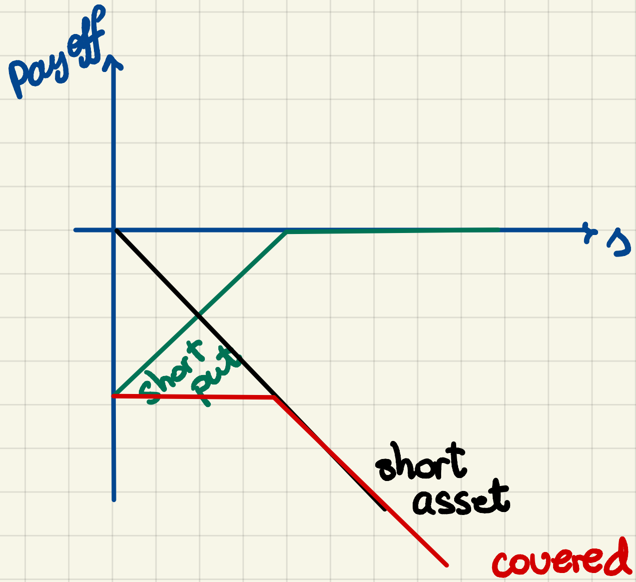


Floor.



floor = $\left\{ \begin{array}{l} \text{long asset} \\ + \\ \text{long put} \end{array} \right.$

Covered Put.



covered put = $\left\{ \begin{array}{l} \text{short put} \\ + \\ \text{short asset} \end{array} \right.$

Problem 6.4.

$$\text{Payoff}(\text{Cap}) = -\min(S(T), K)$$

$$\text{Initial Cost}(\text{Cap}) = -S(0) + V_c(0)$$

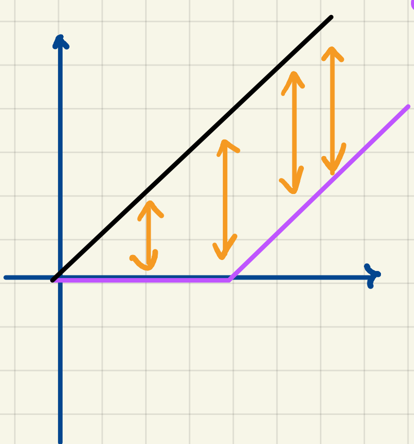
i... effective annual interest rate

$$\text{Profit}(\text{Cap}) = -\min(S(T), K) - FV_{0,T}(-S(0) + V_c(0))$$

$$= -\min(S(T), K) + (-V_c(0) + S(0))(1+i)^T \quad \square$$

given the observed final asset price

Note:



$$\boxed{S(0) \geq V_c(0)}$$

Acceptance-Rejection Method.

Let X and Y be two continuous r.v.s w/ pdf f_X and f_Y.
Assume that

$$\boxed{\frac{f_X(x)}{f_Y(x)} \leq c} \quad \text{for all } x$$

a constant.

We want to simulate n values, say, $x_1, x_2, \dots, x_n$ of the r.v. X.

We know how to simulate values of Y.

The acceptance-rejection method does the following:

Set index = 1.

Until index = n:

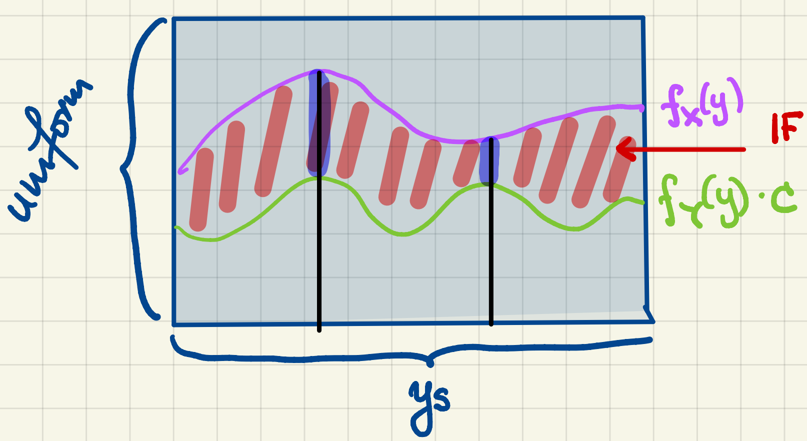
1. Simulate y from Y.
2. Simulate u from $U(0,1)$ independently from Y.
3. TEST

$$\boxed{u \leq \frac{f_X(y)}{c \cdot f_Y(y)}}$$

Yes → $x_{\text{index}} = y$, index = index + 1

No → Reject y

4. Go back to the top.



IF uniform lands here, you accept.