

Financial Derivatives and Risk Management

Online Examination

Student: Surname, Name

Consider the following payoff

$$\begin{aligned}\Pi(T; P) = S_T + \max(K_0 - S_T, 0) \\ + \max(K_1 - S_T, 0) - \max(S_T - K_2, 0)\end{aligned}$$

with $K_0 < K_1 < K_2$

① Describe the financial strategy delivering $\Pi(T; P)$

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- ① Describe the financial strategy delivering $\Pi(T; P)$
- ② Suppose that $K_0 \leq S_T < K_1$: Is $\Pi(T; P) = K_2$?

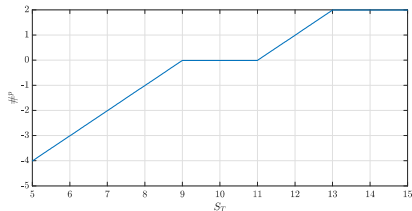
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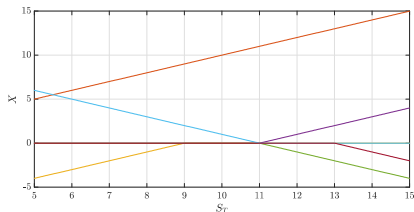
- 1 Describe the financial strategy delivering $\Pi(T; P)$
- 2 Suppose that $K_0 \leq S_T < K_1$: Is $\Pi(T; P) = K_2$?
- 3 Suppose instead that $K_2 = 10 \leq S_T$, $\Pi(0; P) = 8$ and $R = 0$:
What is the portfolio profit?

Topic 2

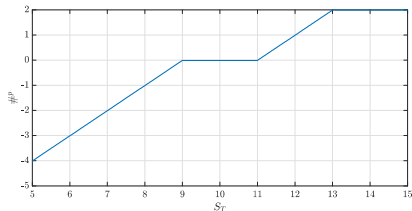


Consider the figure to the left

1 Describe the portfolio's market outlook

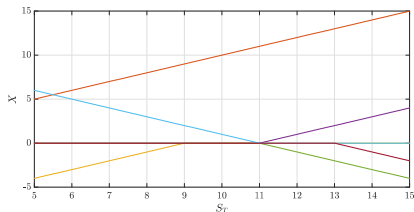


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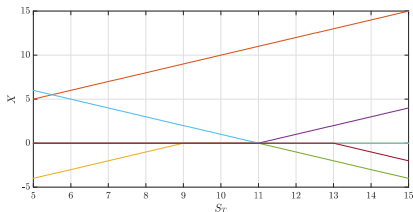
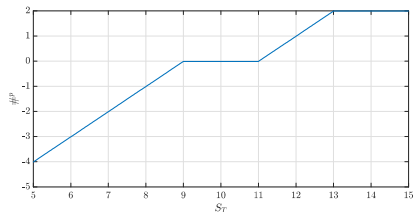


Consider the figure to the left

- 1 Describe the portfolio's market outlook
- 2 Is the asset represented by the purple line part of the portfolio?



Topic 2



Consider the figure to the left

- ① Describe the portfolio's market outlook
- ② Is the asset represented by the purple line part of the portfolio?
- ③ Is the top-panel picture consistent with $\Pi(T; P) = S_T + \max(K_0 - S_T, 0) + \max(K_1 - S_T, 0) - \max(S_T - K_2, 0)$?

Consider the following expression

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- 1 What does $\#$ represent? Which variable should replace it?
- 2 What is the corresponding composition of portfolio h ?
- 3 Is $V_0^h = 0$ consistent with this inequality?

```
1 # = (exp(R*deltaT)-d)/(u-d);  
  [...]  
2 for k = 0:N  
3 if (s*(u^k)*(d^(N-k)) >= K)  
4 tree_C(k+1,N+1) =  
  s*(u^k)*(d^(N-k))-K-Z;  
5 end  
  [...]  
6 end
```

Consider the code to the left

1 What objective do these command help achieve?

- ① $\# = (\exp(R \cdot \Delta T) - d) / (u - d);$
[...]
- ② for $k = 0:N$
- ③ if $(s \cdot (u^k) \cdot (d^{(N-k)})) \geq K$
- ④ $\text{tree_C}(k+1, N+1) =$
 $s \cdot (u^k) \cdot (d^{(N-k)}) - K - Z;$
- ⑤ end
[...]
- ⑥ end

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- ② What does $\#$ represent?

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[...]
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- ① What objective do these command help achieve?
- ② What does $\#$ represent?
- ③ What role does line 4 play in the code?