

Introduction to Finance (PCP)

Assignment

- a. The weight of this assignment is 10% of your final score.
- b. Deadline is **21st, January, 2019**.
- c. Submit your paper through **keio.jp**.
- d. **Only pdf format is allowed.** Writing your paper using Word, Tex and so on, you have to convert it into a pdf file.
- e. In addition, you may submit a scan copy or a photo of a handwritten paper. In such a case, you need to unify jpg (or jpeg) files into one pdf file.

1.

Roll two dice. What are the probabilities that

1. the two numbers will differ by 2,
2. the maximum of the two numbers will be 5 or larger,
3. the maximum of the two numbers is m ?

2.

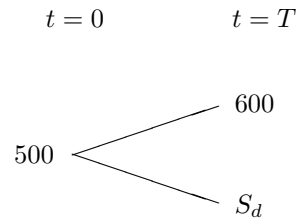
Let A and B be subsets of Ω . Prove that

$$\mathbb{P}(A \cup B) = \mathbb{P}(A) + \mathbb{P}(B) - \mathbb{P}(A \cap B).$$

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3.

Consider a one-period binomial model being composed of one riskless asset with interest rate $r \geq 0$ and one risky asset whose dynamics is given as follows:



Let $r = 0$ and $S_d = 450$.

1. Show the martingale probability.
2. Find the replicating portfolio of a call option with strike price 500.
3. Find its price.

Let $r = 0$ and $S_d = 510$.

4. Construct an arbitrage portfolio.

Let $r = 0.03$ and $S_d = 500$.

5. What is the price of a put option with strike price 520?