

Introduction to Finance (PCP)

Guidance

Materials

All materials will be uploaded on “keio.jp” and my own homepage:
<http://web.econ.keio.ac.jp/staff/arai/>

Evaluation

I do not call the roll.

You need to get more than 50 points in total for your credits.

Final Exam (21, Jan., 2018) 90%

Assignment (TBA) 10%

Schedule (tentative)

- (1) **24, Sep.** Guidance & Introduction
- (2) **01, Oct.** One-period binomial models (model description & portfolio)
- (3) **15, Oct.** One-period binomial models (arbitrage & martingale probability)
- (4) **22, Oct.** One-period binomial models (FTAP & market completeness)
- (5) **29, Oct.** One-period binomial models (linear algebraic approach to FTAP)
- (6) **05, Nov.** Exercise for one-period binomial models
- (7) **12, Nov.** Multi-period binomial models (model description)
- (8) **19, Nov.** Multi-period binomial models (CRR formula)
- (9) **03, Dec.** Multi-period binomial models (American options)
- (10) **10, Dec.** Exercise for multi-period binomial models
- (11) **17, Dec.** General one-period models (model description & FTAP)
- (12) **24, Dec.** General one-period models (proof of FTAP 1)
- (13) **07, Jan.** General one-period models (proof of FTAP 2)
- (14) **21, Jan.** Final Exam

No lecture on 08, October and 14, January for national holidays, and on 26, November for Mita-sai.

Prerequisite

All students have to be able to solve the following questions:

1. Let $A = \{\alpha, \beta, \gamma\}$ and $B = \{\gamma, \delta\}$. Find $A \cup B$ and $A \cap B$.
2. Let X be a random variable distributed as

$$P(X = -1) = \frac{1}{4}, P(X = 0) = \frac{1}{2} \text{ and } P(X = 2) = \frac{1}{4}.$$

Find $P(X \leq 0)$ and $E[X]$.

3. Let $A = \begin{pmatrix} 2 & -1 \\ 1 & 0 \\ -3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -2 & -5 \\ 3 & 4 & 0 \end{pmatrix}$. What is AB ?

4. Solve $\begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$.

5. Let $A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$. What is A^{-1} ?

Textbook

1. Capinski, M., and Zastawniak, T. (2010) Mathematics for finance: An Introduction to Financial Engineering, 2nd edition, Springer.
2. Roman, S. (2014) Introduction to the mathematics of finance: from risk management to options pricing. 2nd edition, Springer.
3. Shreve, S. (2012) Stochastic calculus for finance I: the binomial asset pricing model. Springer.