Unit 10 - Week 8: Risk-Neutral Pricing in Discrete-Time (Part 2)

Course outline

How to access the portal?

Week 0

Week 1: Introduction to Financial Markets and Instruments

Week 2: Time Value of Money and Riskfree Assets

Week 3: Modern Portfolio Theory (Part 1)

Week 4: Modern Portfolio Theory (Part 2)

Week 5: Fundamentals of Derivatives

Week 6: Derivative pricing by replication in binomial model

Week 7: Risk-Neutral Pricing in Discrete-Time (Part 1)

Week 8: Risk-Neutral Pricing in Discrete-Time (Part 2)

- Lec 22: Examples of Conditional Expectations, Martingales
- Lec 23: Risk-Neutral Pricing of European Derivatives in Binomial Model
- Lec 24: Actual and Risk-Neutral Probabilities, Markov Process, American Options
- Quiz : Assignment 8
- Feedback Form
- Solution: Assignment 8

Week 9: Introductory Stochastic Calculus (Part 1)

Week 10: Introductory Stochastic Calculus (Part 2)

Week 11: Risk-Neutral Pricing in Continuous-Time (Part 1)

Week 12: Risk-Neutral Pricing in Continuous-Time (Part 2)

Text Transcripts

Live Session

Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-25, 23:59 IST.

1) In a three-period binomial model setup, if $E(S_2|S_3 = x) = g(x)$, then the number of possible non-zero values of the function g equals:

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 4

1 point

2) State whether the following statement is TRUE or FALSE:
In an N-period binomial model setup, the process $\{Y_n, 0 \leq n \leq N\}$, where $Y_n = S_{n+1}^2 - S_n$, is adapted to the filtration $\{\mathcal{F}_k\}_{k=0}^N$, where $\mathcal{F}_k$ is the σ-field containing the sets determined by the first k tosses.

1 point

- TRUE
- FALSE

No, the answer is incorrect.
Score: 0
Accepted Answers:
FALSE

3) Consider an N-period binomial model setup with the filtration $\{\mathcal{F}_k\}_{k=0}^N$, where $\mathcal{F}_k$ is the σ-field containing the sets determined by the first k tosses. Then which of the following is/are not always true?

(A) $E[E(S_5|\mathcal{F}_2)|\mathcal{F}_4] = E[S_5|\mathcal{F}_2]$.
(B) $E[E(S_5|\mathcal{F}_4)|\mathcal{F}_2] = E[S_5|\mathcal{F}_4]$.
(C) $E[E(S_5|\mathcal{F}_5)] = S_5$.
(D) $E[E(S_5|\mathcal{F}_6)] = E[S_5]$.

1 point

- (A)
- (B)
- (C)
- (D)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(A)
(D)

4) State whether the following statement is TRUE or FALSE:
In an N-period binomial model setup, the stock price process $\{S_n, 0 \leq n \leq N\}$ is both a martingale and a Markov process.

1 point

- TRUE
- FALSE

No, the answer is incorrect.
Score: 0
Accepted Answers:
FALSE

5) Which of the following is/are always true for discrete-time stochastic processes?

(A) Every martingale is both a submartingale and a supermartingale.
(B) A process which is a submartingale is also a martingale.
(C) If $\{M_n\}_{n\geq 0}$ is a martingale and $\phi(\cdot)$ is a convex function, then $\{E(M_n)\}_{n\geq 0}$ is an increasing sequence.
(D) Given a random variable Z with $E|Z| < \infty$ and given a filtration $\{\mathcal{F}_n\}_{n=0}^N$, the process $\{Z_n\}$ defined by $Z_n = E(Z|\mathcal{F}_n)$ is Radon-Nikodým derivative process.

2 points

- (A)
- (B)
- (C)
- (D)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(A)
(C)

6) State whether the following statement is TRUE or FALSE:
In an N-period binomial model setup, the no-arbitrage price V_n at time n of a derivative with payoff $V_N = \max_{0\leq i\leq N} S_i - S_N$ can be written as $V_n = h(S_n)$ for some real valued function h.

1 point

- TRUE
- FALSE

No, the answer is incorrect.
Score: 0
Accepted Answers:
FALSE

7) Which of the following is/are always true in an N-period binomial model setup?

(A) The risk-neutral probability measure is unique.
(B) The expectation of the random variable S_n under the real-world probability measure is always greater than or equal to the expectation of S_n under the risk-neutral measure.
(C) The initial price of an European option and an American option with the same payoff function is the same if the payoff function is path-independent.

1 point

- (A)
- (B)
- (C)

No, the answer is incorrect.
Score: 0
Accepted Answers:
(A)

8) In a three-period binomial model with parameters $u = 1.1, d = 0.95, r = 0.03$ and $S_0 = 60$, the initial price of an American put option that expires at time three and has a strike price of 62 equals:

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 2.45,2.60

2 points