

Computational Finance

Jan 9, 2023

Surname-Name:.....

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Available time: 90 minutes

Consider Exercise1.m .

1. which option is priced (Call-Put, European-Barrier and, if Barrier, which type)? Which dynamic for the underlying asset? *Which PIDE is considered? (write the PIDE and the transformation used, if any (log-price, log-moneyness etc.)? *Which discretization? (Explicit/Implicit Euler, Crank nicholson-theta method)?
2. write a Montecarlo code to price the same derivative, and compare the prices (Finite Difference price VS Montecarlo confidence interval).
Price FD:
Price MC: (.....,.....)
3. modify Exercisel.m to price an American option, and compare the obtained price with the one of an European option. *Comment the comparison.
Price:
4. modify the Montecarlo code to evaluate a Geometric Asian option with maturity $T = 2$ and payoff

$$\left(\left(\prod_{n=1}^{24} S(n\Delta t) \right)^{1/24} - S(T) \right)^+, \quad \Delta t = 1/12,$$

and an underlying asset where the log-price follows a Variance Gamma of parameters

$$\sigma = 0.12, \theta = 0.03, k = 0.20$$

Price with simulations:.....

Confidence Interval with simulations:.....

* Multichance students can avoid this part