Hw3 Implied Volatility

Description:

Use the bisection method and Newton's method to calculate European call and put's implied volatilities, respectively. Each method should be based on both Black-Scholes formulas and the binomial tree model. In addition, American call and put's implied volatilities are required in the case of the binomial tree model.

User Manual:

Double click "Hw3 Implied Volatility.exe"

→Click "Input" at the upper left corner of the window

→Input the following parameters in the dialogue box:

Pricing Method: Use Black-Scholes formulas (Black-Scholes) or the binomial tree model (Binomial Tree). If "Binomial Tree" is checked, specify the number of time steps (n) and whether the option is European (European) or American (American).

Estimation Method: Use the bisection method (Bisection) or Newton's method (Newton). Specify the maximum allowed estimation error (tol).

Option Type: Choose either a call option (Call) or a put option (Put). Input its market price (P).

S: Current stock price

r: One-year risk-free interest rate (e.g., 10% => r = 0.1)

T: Expiration date (e.g., 6 months => T = 0.5)

K: Strike price

q: One-year dividend yield (e.g., 2% => q = 0.02)

→Click "OK" at the lower right corner of the dialogue box (or "Cancel" if you would like to exit the dialogue box)

→Calculation result will be shown on the display area of the window

→If you would like to perform another calculation, click "Input" at the upper left corner and repeat the process above. (The dialogue box will save the parameters you input last time.) Or you can click "X" at the upper right corner of the window to exit the program.