Options Pricing with Binomial and Black-Scholes Models

This project demonstrates how to use binomial models and the Black-Scholes formula to price European-style options using Python. The code fetches historical stock prices using yfinance, calculates volatility and returns, and estimates the option price based on various mathematical models.

Requirements

Install the required dependencies by running the following command:

- pip install yfinance numpy matplotlib pandas scipy

Code Explanation

fetch_historical_data()

- Downloads the closing prices of the specified stock from Yahoo Finance for a given date range.

calculate_mu_sigma()

- Calculates the expected return (mu) and volatility (sigma) based on historical prices using daily log returns.

binom_EU1()

- Implements the binomial model to price European-style options. The function recursively calculates the option's value using a multi-step tree.

black_scholes_call()

- Calculates the Black-Scholes call option price using the closed-form formula for European options.

plot_prices()

- Plots the historical stock prices using matplotlib.