Project - Quantitative Finance

Objectives:

1. **Build in Python Black-Scholes price** for vanilla options (calls & puts)

2. **Build a volatility implied tool** that will take vanilla options prices. Verify if the prices are arbitrage-free.

3. **Take the following PDE:**

$$\sigma(t, X) = \left(\gamma e^{-t} + \alpha\right) \cdot \sqrt{\sigma_0^2 + \rho(X - X_0) + \frac{\nu}{2}(X - X_0)^2}$$

$$X_0 = 100$$

- Discretization using Euler schemes.
- Price calls with different strikes: 85, 90, 95, 100, 105, 110
- Move the value of the parameters as you please.
- Imply the implied volatility from the prices and comment as function of the parameters.