Fintech 545, week4

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Problem 1 :

Mean and standard deviation for Classical Brownian Motion: 99.99795940264922 0.19799307164773886

Mean and standard deviation for Arithmetic Return System: 99.79594026492235 19.799307164773882

Mean and standard deviation for Log Return or Geometric Brownian Motion: 101.77191991266514 20.351813200520233

Problem 2:

VaR (Normal Distribution): -0.05428693242254699

VaR (EWMA): -0.030137068179582536

VaR (T Distribution): -0.043134714950376095

VaR (AR(1) Model): -0.05422696780310033

VaR (Historic Simulation): -0.03948424995533789

Normal VaR indicates the highest risk.

EWMA VaR shows the least risk, suggesting recent lower volatility.

T Distribution VaR reflects higher risk than EWMA, accounting for extreme events.

AR(1) VaR is close to Normal VaR, implying similar risk estimation.

Historic Simulation VaR is mid-range in risk level.

Problem 3:

Portfolio A VaR: $15242.09

Portfolio B VaR: $7775.09

Portfolio C VaR: $17836.00

Total VaR: $38039.28

I switch to calculate return using Arithmetic Return System, offering an intuitive and straightforward metric for assessing short-term investment performance, directly reflecting the absolute change in investment value. Suitable for rapid analysis and decision-making, they are a fundamental tool in financial analysis.

Portfolio A VaR (Simple Returns): $15206.39

Portfolio B VaR (Simple Returns): $7741.25

Portfolio C VaR (Simple Returns): $17877.73

Total VaR (Simple Returns): $37972.29

Comparing to the previous, total VaR is a bit lower.