# Homework 3

Price a maximum rainbow option with the payoff $\max(\max(S_{1T}, S_{2T}, ..., S_{nT}) - K, 0)$ using the Monte Carlo simulatiton.

(Inputs: $K$, $r$, $T$, number of simulations, number of repetitions, $n$, $S_{10}$, $S_{20}$, ..., $S_{n0}$, $q_1$, $q_2$,..., $q_n$, $\sigma_1$, $\sigma_2$,..., $\sigma_n$, $\rho_{ij}$. Outputs: Option value and 95% confidence interval.)

- The basic requirment (80 points):

  Apply the Cholesky decomposition method to pricing the above rainbow option.

- Bonus 1 (5 points):

  Combine the antithetic variance approach and moment matching method to price the above rainbow option.

- Bonus 2 (10 points):

  Implement the inverse Cholesky method in Wang (2008) to price the above rainbow option.

- Reference

  Wang (2008), "Variance Reduction for Multivariate Monte Carlo Simulation," *Journal of Derivatives* 16, pp. 7–28.