# Price maximum rainbow option with the Monte Carlo -

# Cholesky、Inverse Cholesky

Calculate price of maximum rainbow option with Monte Carlo with following method:
1. Cholesky
2. Combine the antithetic variate approach and moment matching
3. Inverse Cholesky

## 1. Cholesky

Input :
1. K, r, T, number of simulations, number of repetitions, n
2. list of current prices, sigma
3. matrix of correlation coefficient with list format (n*n)

data process :
1. Calculate Covariance array with sigma and correlation coefficient
2. Array of random samples (number of simulations *n)

Calculation :
1. Transform Covariance array into array A with Cholesky Decomposition
2. np.dot(Array of random samples, array A )

## 2. Combine the antithetic variate approach and moment

## matching method

With the same input and final calculation
data process :
1. Create new random samples(mean = 0, std = 1) with sigma and correlation coefficient of random samples

## 3. Implement the inverse Cholesky method

With the same input
data process :
1. Create new random samples(mean = 0, std = 1) with sigma and correlation

coefficient of random samples

2. Calculate variance-covariance matrix(c2) of new random samples
3. Transform Covariance array into array c2 with Cholesky Decomposition
4. np.dot(Array of random samples, np.dot(inverse matrix of c2, array A ) )