%% stock data

stock1 = 100;

return1 = 0.03;

sigma1 = 0.20;

stock2 = 100;

return2 = 0.2;

sigma2 = 0.30;

%% create return and sigma

%% matrices

Return = diag([return1 return2]);

Sigma = diag([sigma1 sigma2]);

%% 2-dimentional gbm

correlation = [1 0.2; 0.2 1];

stocks = gbm(Return, Sigma,...

'StartState' ,[100; 100],...

'correlation', correlation);

%% simulations!

DeltaTime = 1/360;

nobs = 360;

nTrials = 20000;

ss = simulate(stocks,nobs, ...

'DeltaTime', DeltaTime,...

'nTrials', nTrials);

%% extract stocks

s1 = squeeze(ss(:,1,:));

s2 = squeeze(ss(:,2,:));

%% see corresponding plots

tt = [s1(:,55) s2(:,56)];

plot(tt);

%% price rainbow option

rate = 0.03;

rainbow\_payoff =...

max(s1(end,:), s2(end,:));

rainbow\_price =...

mean(rainbow\_payoff\*...

exp(-rate\*nobs\*DeltaTime));

%%

%% Price exchange option

exchange\_payoff =...

max(s1(end,:)- s2(end,:),0);

exchange\_price =...

mean(exchange\_payoff\*...

exp(-rate\*nobs\*DeltaTime));