%% exit time computation

%% basic data

%% stock data

stock1 = 0;

return1 = 0;

sigma1 = 1;

stock2 = 0;

return2 = 0;

sigma2 = 1;

%% create return and sigma

%% matrices

Return = [return1 ;return2];

Sigma = diag([sigma1 sigma2]);

%% 2-dimentional gbm

correlation = [1 0.2; 0.2 1];

stocks = bm(Return, Sigma,...

'StartState' ,[stock1; stock2],...

'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 plot

tt = [s1(:,1) s2(:,1)];

scatter(tt(:,1),tt(:,2));

%% distance computing and min time

dist = sqrt(s1.^2 + s2.^2);

time = [(dist > 1);ones(1,nTrials)];

for i = 1: nobs+2

firstpassage(i) = mod(min(find(time(:,i)==1)),362);

end

firstpassage = firstpassage';