%% Covered call probabilistic analysis

%% Get all prices and future prices

stock\_price = 20;

stock\_prices\_future = [40 20 12]';

bond\_price = 90;

bond\_prices\_future = [100 100 100]'

option1\_price = 10;

option2\_price = 6;

option1\_prices\_future = [25 5 0]'; %strike 15

option2\_prices\_future = [20 0 0]'; %strike 20

%% get returns

stock\_returns = (stock\_prices\_future - stock\_price)/stock\_price;

option1\_returns =(option1\_prices\_future - option1\_price)/option1\_price;

option2\_returns =(option2\_prices\_future - option2\_price)/option2\_price;

%% expected profits

expected\_profit\_stock = mean(stock\_prices\_future - stock\_price);

expected\_profit\_bond = 10;

expected\_profit\_option1 = mean(option1\_prices\_future - option1\_price);

expected\_profit\_option2 = mean(option2\_prices\_future - option2\_price);

%% expected returns

expected\_stock\_return = mean(stock\_returns);

expected\_option1\_return = mean(option1\_returns);

expected\_option2\_return = mean(option2\_returns);

%% define the function to maximize

f = -[expected\_profit\_stock expected\_profit\_bond...

expected\_profit\_option1 expected\_profit\_option2];

%% constraints

%% Budget constraint

A = [20 90 10 6];

b = 50000;

lb = [ 0,0 , -6000, -6000];

%ub = [ inf,inf , 5000, 5000];

%% solve linear program maximizing expected profit

[x fval]= linprog(f, A, b, [], [],lb, []);

%% what is expected profit?

expected\_profit = - f \*x;

%% compute cost of portfolio

cost = x' \* [stock\_price; bond\_price; option1\_price; ...

option2\_price];

%% computation of Risk

portfolio\_prices\_future = x' \* [stock\_prices\_future ...

bond\_prices\_future ...

option1\_prices\_future ...

option2\_prices\_future]';

portfolio\_returns = (portfolio\_prices\_future- cost)/cost;

mu = mean(portfolio\_returns);

sigma = std(portfolio\_returns);

%% calculate sharpe!

sharpe = mu/sigma;