Optimization and Algorithms
Project report

Group 58
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1 Task 1

Note that each task has its own section. So, put all the data (figures, numbers, tables) asked for in a task in its own section.

Plutting a matlab file code in your report is easy:

```
% portfolio.m; uses package CVX from http://cvxr.com/cvx
n = 10; % number of stocks
r = 1+0.3*rand(n-1,1); % generate random returns
r = [ r ; 1 ]; % the last one is a risk-free asset
T = 1000; % set budget

% solve the optimization problem
cvx_begin quiet
   variable x(n);
   maximize(r'*x);

   %subject to
   x ≥ 0; sum(x) == T;
   for i = 1:n
     for j = i+1:n
        x(i) + x(j) ≤ 0.8*T;
     end;
   end;
cvx_end;

figure(1); clf; % plot solution
subplot(1,2,1); stem(r,'LineWidth',5);
title('rates of return r');
subplot(1,2,2); stem(x,'r','LineWidth',5);
title('optimal portfolio x');
```

Figure 1 shows a single picture.

Figure 2 show two pictures, side by side.

Sometimes, a table is the most useful way to give information. See table 1 for an example.

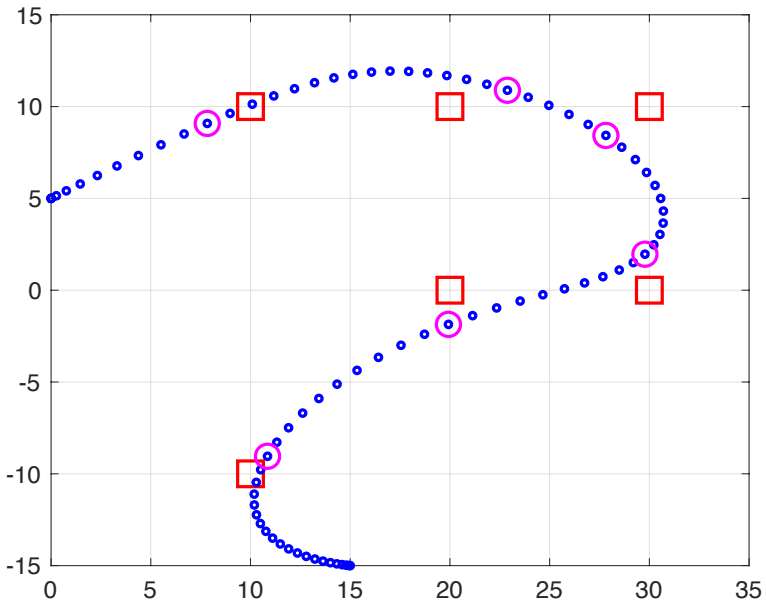
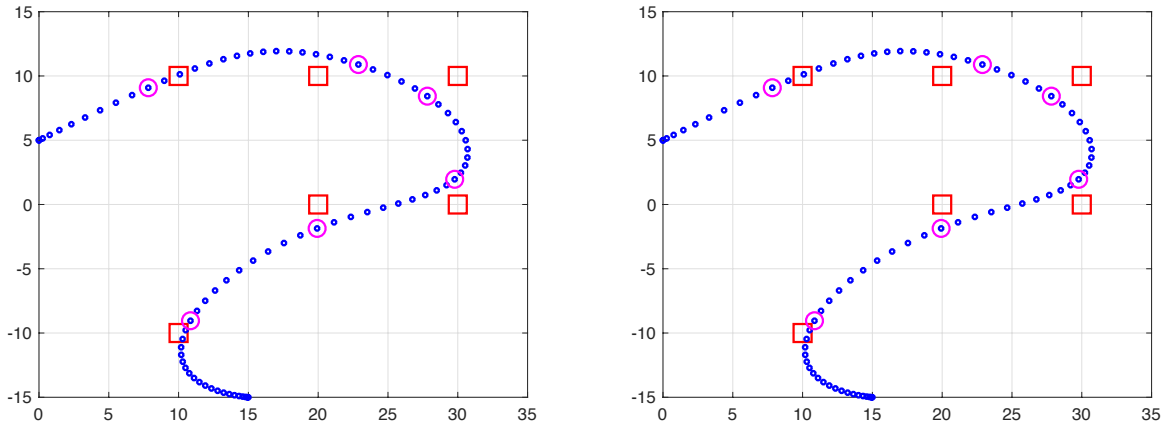


Figure 1: Positions of the robot from $t = 0$ to $t = T$ are the small blue circles; the positions at appointed times τ_k, for $1 \leq k \leq K$, are the large magenta circles. The waypoints are the red squares. Case $\lambda = 10^{-1}$ with ℓ_2^2 regularizer.



(a) Caption A

(b) Caption B

Figure 2: A figure with two pictures.

λ	d_1	d_2
10^{-3}	25.98	0.03
10^{-2}	18.97	1.05
10^{-1}	16.65	2.79

Table 1: An example of a table.

2 Task 2

3 Task 3

4 Task 4