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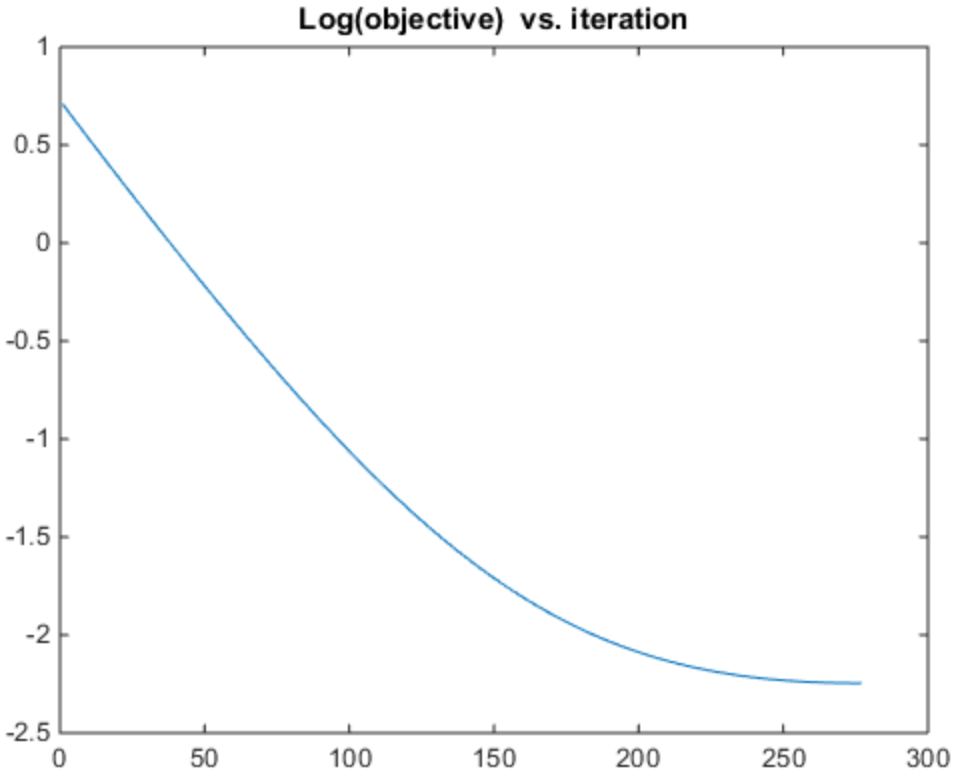
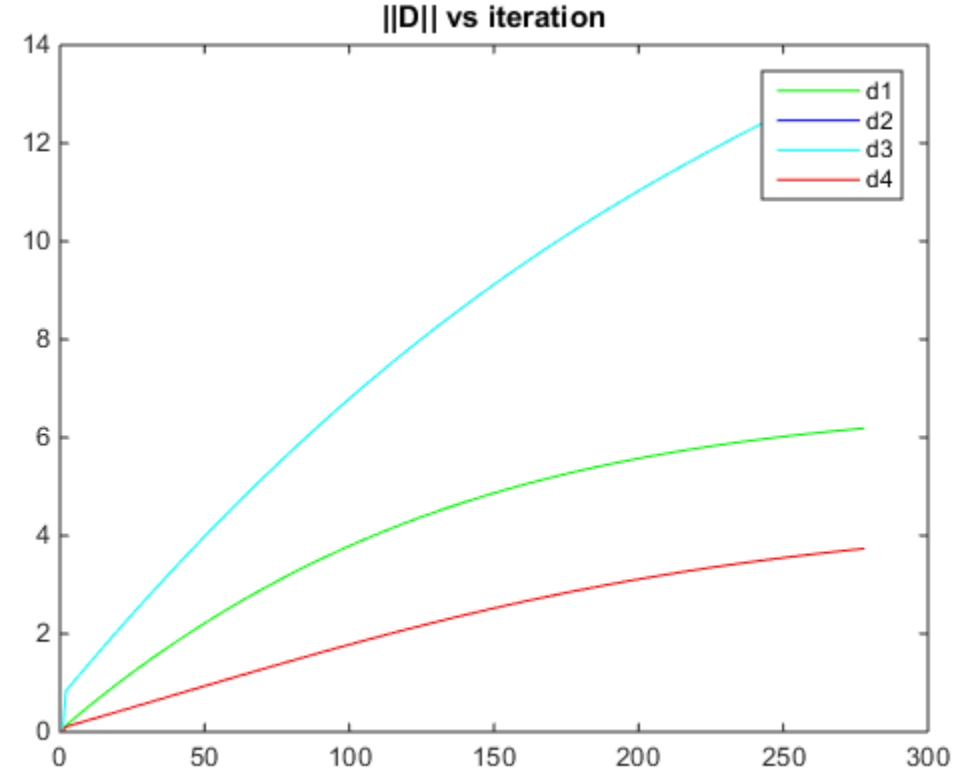
```
close all;
clear all;
```

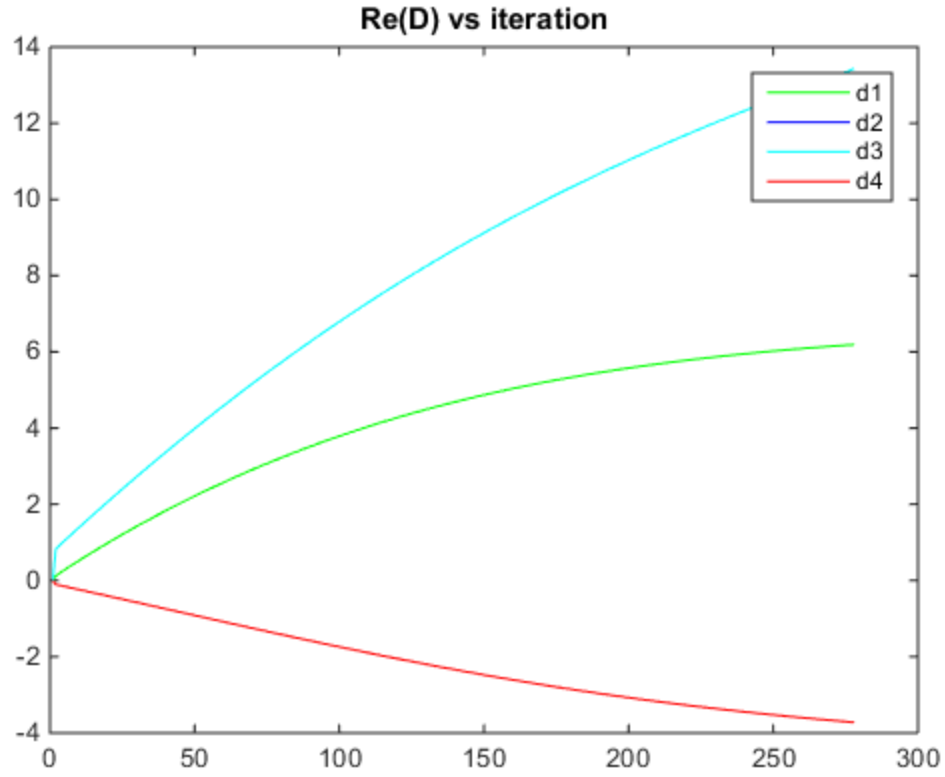
Part a)

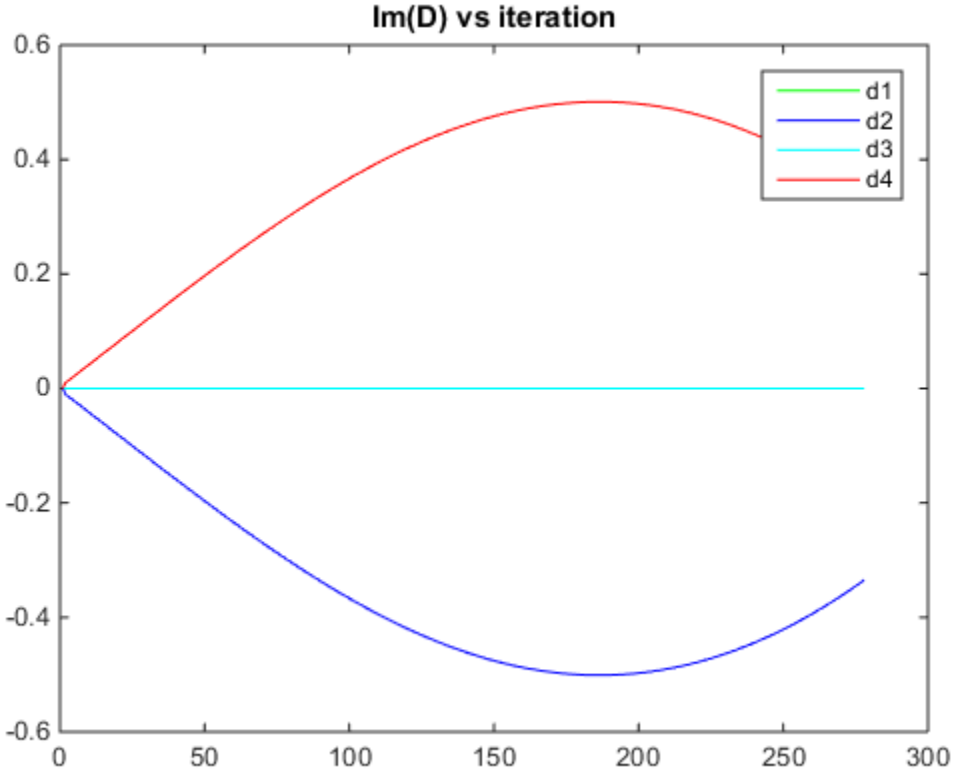
```
 % getDmatrix function estimates the D matrix using the Levenberg-Marquadtt Optimi
intitial_l1 = 0.1;
intitial_l2 = 0.1;
intitial_l3 = 0.1;
[D,L,objective,d1,d2,d3,d4] = getDMatrix(intitial_l1,intitial_l2,intitial_l3);

disp('The estimate of D is :');
disp(D);

 % Plot the log(objective) and di's as a function of iterations
figure;
plot(objective);
title('Log(objective)  vs. iteration');
plotD(d1,d2,d3,d4);
```

```
The estimate of D is :
   6.1915 + 0.0000i  -3.7207 - 0.3346i
  -3.7207 + 0.3346i  13.4291 + 0.0000i
```


Log(objective) vs. iteration
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
0
50
100
150
200
250
300


||D|| vs iteration
14
12
10
8
6
4
2
0
0
50
100
150
200
250
300
d1
d2
d3
d4


Re(D) vs iteration
d1
d2
d3
d4
14
12
10
8
6
4
2
0
-2
-4
0
50
100
150
200
250
300


Im(D) vs iteration
d1
d2
d3
d4
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
0
50
100
150
200
250
300

Part b)

```
 % The diffusion is mac along the principal vector ie. the max eigenvector of D

[U,S,V] = svd(L);
principalVector = U(:,1);

disp('The direction along which max. diffusion takes place is :');
disp(principalVector);
```

```
The direction along which max. diffusion takes place is :
  -0.3900 - 0.0055i
   0.9182 - 0.0695i
```

Part c)

```
 % The multiplication factor is just the ratio of the eigenvectors in the correspo
multiplicationFactor = U(:,1)./U(:,2);

disp('The multiplication factor along principalVector and orthogonal vector is :')
disp(multiplicationFactor);
```

```
The multiplication factor along principalVector and orthogonal vector is :
   0.4236 + 0.0000i
  -2.3610 - 0.0000i
```

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