test

Contents


```
%Home Work9
```

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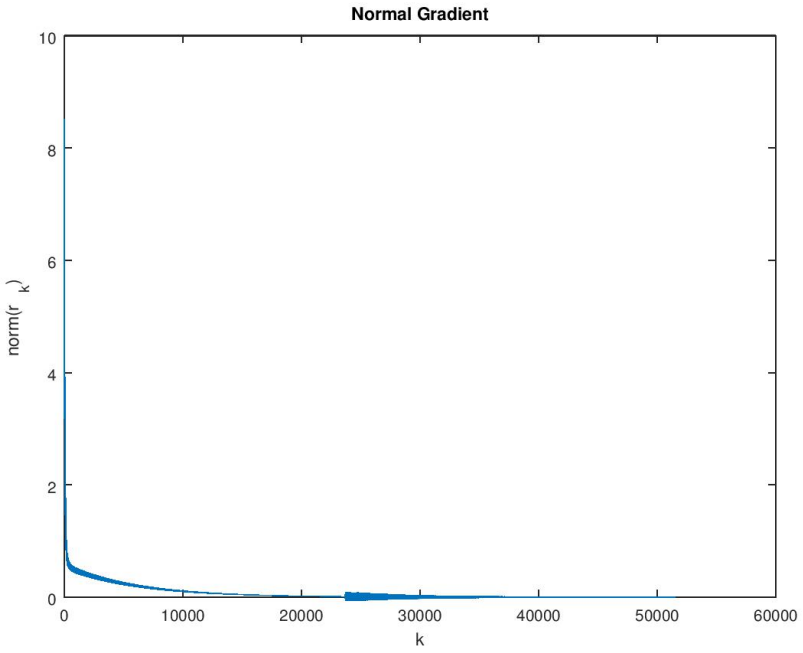
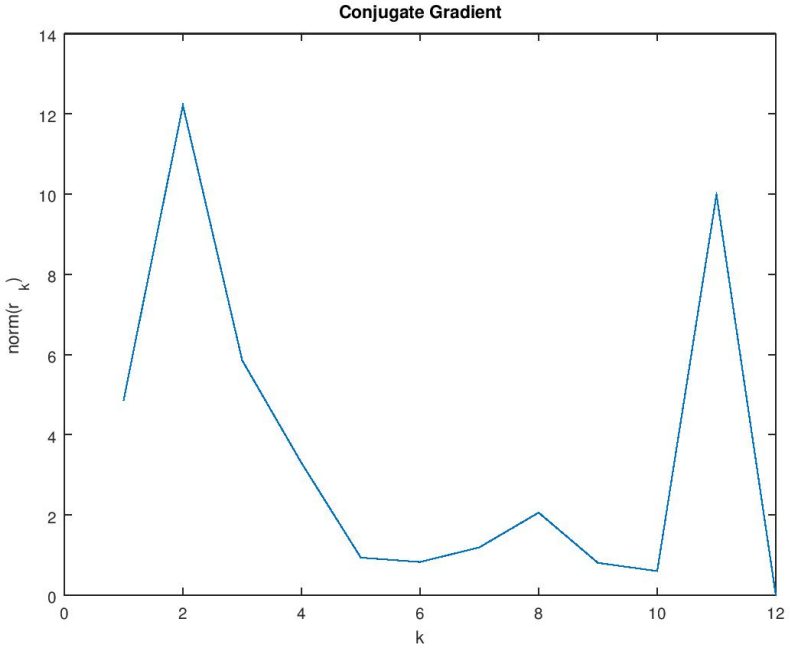
```
quantity = 10;


% Initialization
A = rand(quantity);
A = A'*A
b = randn(quantity,1)


% Gradient descent
[x, norm_rk, k] = GD(A,b);
figure(1)
plot(norm_rk(1,1:k));
xlabel("k");
ylabel("norm(r_k)");
title("Normal Gradient");


% Gradient descent
a = 3
[x, norm_rk, k] = CG(A,b);
figure(2)
plot(norm_rk(1,1:k));
xlabel("k");
ylabel("norm(r_k)");
title("Conjugate Gradient");
```

```
A =
 Columns 1 through 8:
   3.8867   2.3049   3.0317   2.3764   3.3421   2.0709
         2.8745   2.6193
   2.3049   2.6436   2.1365   1.9379   3.5222   2.7645
         2.1944   2.0504
   3.0317   2.1365   3.9213   2.4505   3.1409   2.5427
         2.4963   3.2624
   2.3764   1.9379   2.4505   2.5906   2.6666   2.1218
         2.0093   2.0931
   3.3421   3.5222   3.1409   2.6666   5.1758   3.3803
         3.2108   2.8492
   2.0709   2.7645   2.5427   2.1218   3.3803   3.5573
         2.2995   2.6835
   2.8745   2.1944   2.4963   2.0093   3.2108   2.2995
         2.7558   2.5780
   2.6193   2.0504   3.2624   2.0931   2.8492   2.6835
         2.5780   3.3437
   2.7603   2.0540   2.1704   1.8423   2.8814   2.1811
         2.3729   2.2792
   2.0224   1.7989   2.2451   2.3840   2.6553   1.8938
         1.8230   2.0634
 Columns 9 and 10:
   2.7603   2.0224
   2.0540   1.7989
   2.1704   2.2451
   1.8423   2.3840
   2.8814   2.6553
   2.1811   1.8938
   2.3729   1.8230
   2.2792   2.0634
   2.7069   1.6986
   1.6986   2.8650
b =
  -2.31343
   0.24417
  -0.81010
   2.19298
   1.39457
   0.77246
   1.62016
   0.27664
   2.54034
  -1.04158
a =  3
```


Normal Gradient
norm(r_k)
k
0
2
4
6
8
10
0
10000
20000
30000
40000
50000
60000


Conjugate Gradient
norm(r_k)
k
0
2
4
6
8
10
12
14
0
2
4
6
8
10
12