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18-660
Hw6

The first page is my code for produces the plots. The second page is the actual plot of all three regressions using different values for lambda as well as exp(x) itself. The black line is exp(x), the red line is regression with lambda=10^-6, the green line is regression with lambda=1, the blue line is regression with lambda=10^6. On the third page I have printed out the alpha values. alphaLambda1 corresponds to lambda=10^-6, alphaLambda2 corresponds to lambda=1, alphaLambda3 corresponds to lambda=10^6

```matlab
1 -    ones = ones(1,5);
2 -    x = 0:.25:1;
3 -    A = transpose([x.^4; x.^3; x.^2; x; ones]);
4 -    Fx = transpose([1.53, 3.11, -0.61, 2.97, 3.03]);
5 -    zeros = zeros(1, 5);
6 -    zeros = transpose(zeros);
7 -    Fx = [Fx;zeros];
8 -    l1 = 10^-6;
9 -    l2 = 1;
10 -   l3 = 10^6;
11 -   vl1 = [sqrt(l1), sqrt(l1), sqrt(l1), sqrt(l1), sqrt(l1)];
12 -   vl2 = [sqrt(l2), sqrt(l2), sqrt(l2), sqrt(l2), sqrt(l2)];
13 -   vl3 = [sqrt(l3), sqrt(l3), sqrt(l3), sqrt(l3), sqrt(l3)];
14 -   ml1 = diag(vl1);
15 -   ml2 = diag(vl2);
16 -   ml3 = diag(vl3);
17 -   A1 = [A; ml1];
18 -   A2 = [A; ml2];
19 -   A3 = [A; ml3];
20 -   alphaLambda1 = A1\Fx;
21 -   alphaLambda2 = A2\Fx;
22 -   alphaLambda3 = A3\Fx;
23 -   domain = [0:1:100];
24 -   func1 = (alphaLambda1(1))*domain.^4 + (alphaLambda1(2))*domain.^3 + (alphaLambda1(3))*domain.^2 + (alphaLambda1(4))*domain + alphaLambda1(5);
25 -   func2 = (alphaLambda2(1))*domain.^4 + (alphaLambda2(2))*domain.^3 + (alphaLambda2(3))*domain.^2 + (alphaLambda2(4))*domain + alphaLambda2(5);
26 -   func3 = (alphaLambda3(1))*domain.^4 + (alphaLambda3(2))*domain.^3 + (alphaLambda3(3))*domain.^2 + (alphaLambda3(4))*domain + alphaLambda3(5);
27 -   plot(domain, exp(domain), 'k',domain, func1, 'r', domain, func2, 'g', domain, func3, 'b');
28 -   axis([0, 60, -400, 400]);
```
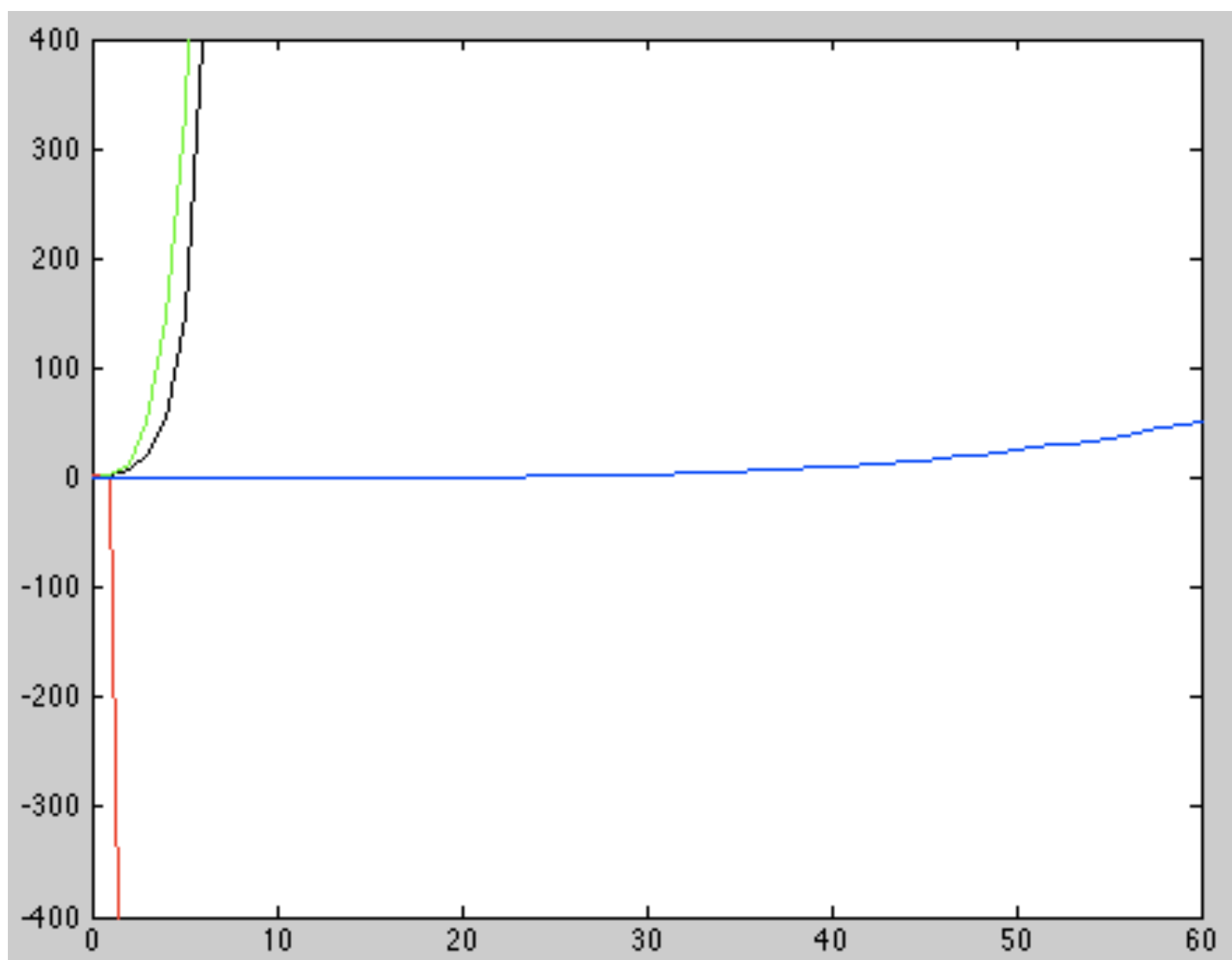
```
alphaLambda1 =

  -237.2099
   483.6397
  -299.1133
    54.1732
     1.5529


alphaLambda2 =

     0.4322
     0.4219
     0.3741
     0.3546
     1.1975


alphaLambda3 =

   1.0e-04 *

     0.0394
     0.0426
     0.0474
     0.0573
     0.1003
```