

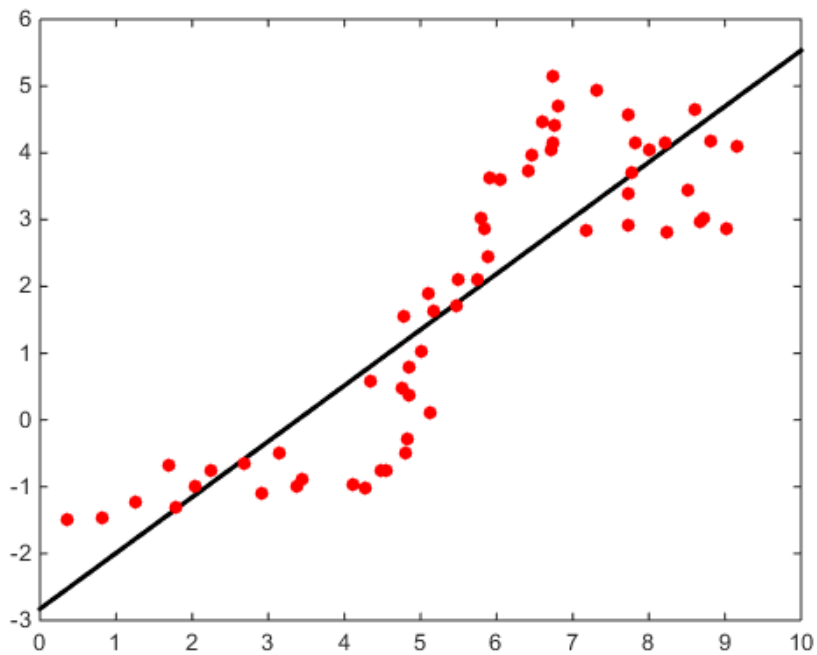
Nick Imkamp 62086284 Homework 2

%1a

```
data = load('data/curve80.txt');  
x = data(:,1);  
y = data(:,2);  
[Xtr Xv Ytr Yv] = splitData(x,y,.75);
```

%1b

```
linear_regression = linearRegress(Xtr,Ytr);  
xs = [0:.05:10]';  
ys = predict(linear_regression, xs);  
figure(8);  
plot(xs,ys,'-k',Xtr,Ytr,'r.', 'markersize', 20, 'linewidth', 2);
```



```
mse(linear_regression, Xtr, Ytr) ans = 1.1277
```

```
mse(linear_regression, Xv, Yv) ans = 2.2423
```

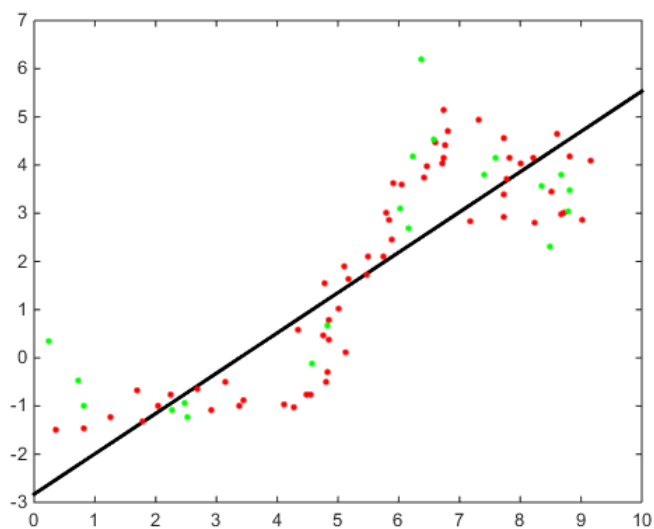
%1c

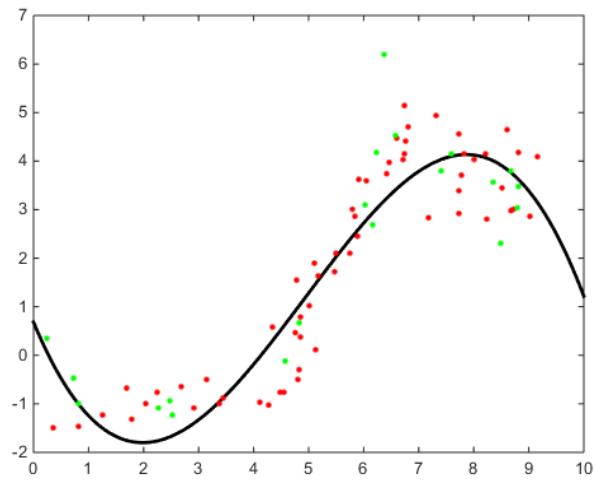
```
D = [1, 3, 5, 7, 10, 18];  
errors=[];  
for degree=1:6,  
    figure(degree)  
    XtrP = fpoly(Xtr, D(degree), false);  
    [XtrP, M,S] = rescale(XtrP);  
    %Phi = @(x) rescale( fpoly(x,degree,false), M,S);
```

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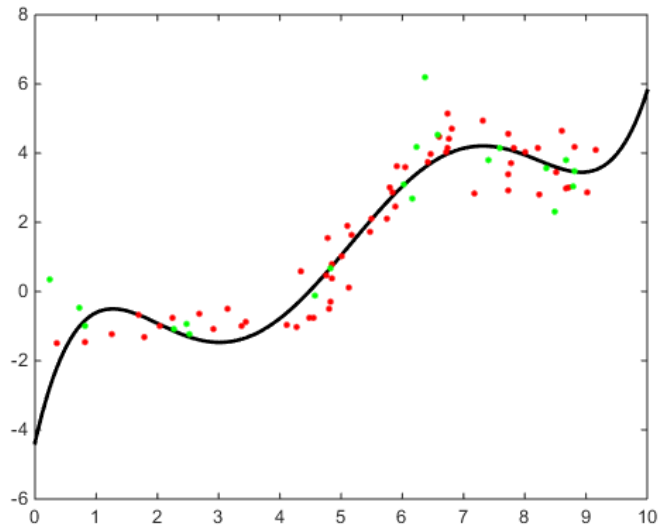
```
lr = linearRegress(XtrP, Ytr);  
phi = rescale(fpoly(xs, D(degree), false), M, S);  
plot(xs, predict(lr, phi), 'k-', Xtr, Ytr, 'r.', Xv, Yv, 'g.', 'markersize', 10, 'linewidth', 2)  
ax = axis;  
  
Xvp = rescale(fpoly(Xv, D(degree), false), M, S);  
errors(:, end+1) = [mse(lr, XtrP, Ytr) , mse(lr, Xvp, Yv)];  
snapnow;  
end;  
figure(7);  
semilogy(D, errors(1,:), '-r', D, errors(2,:), '-g');  
  
%2
```

D=1

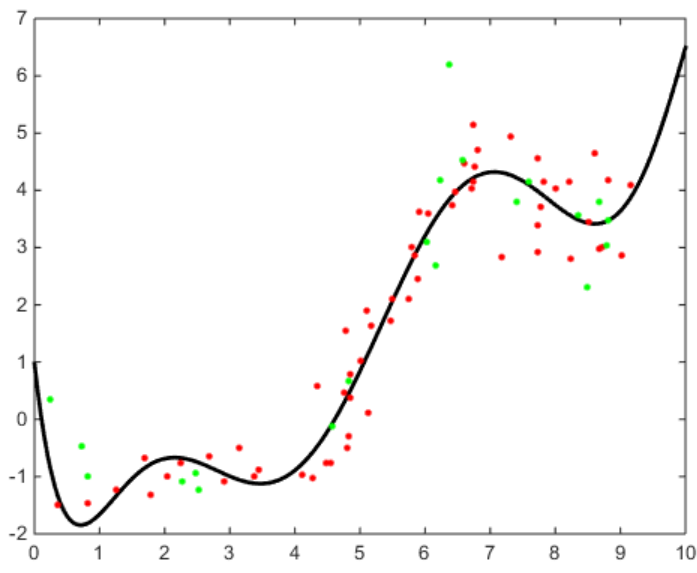




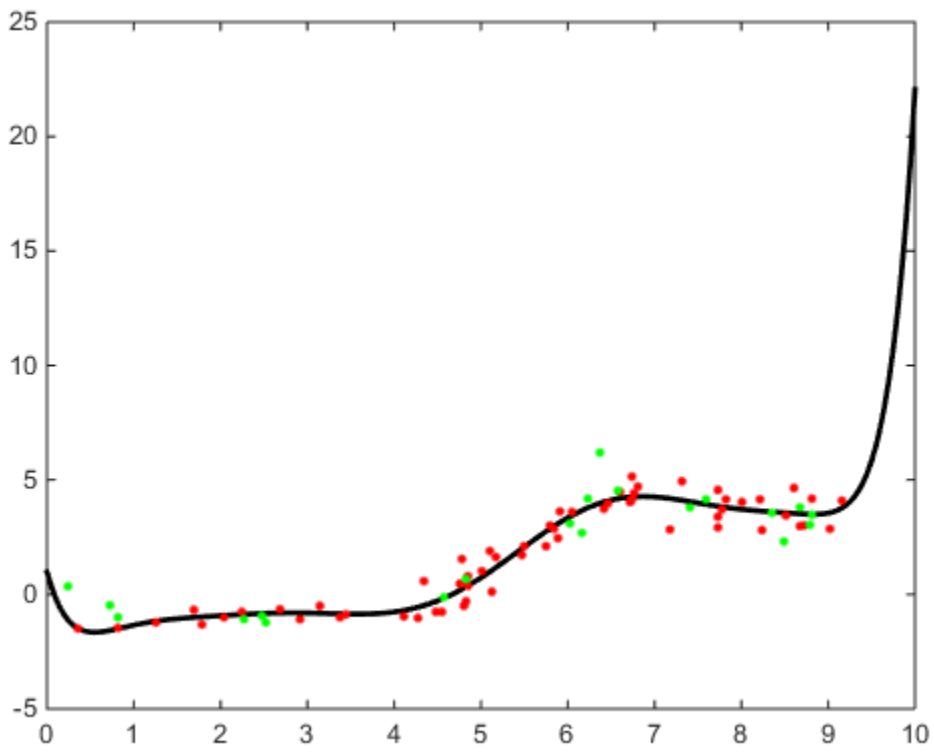
D=3



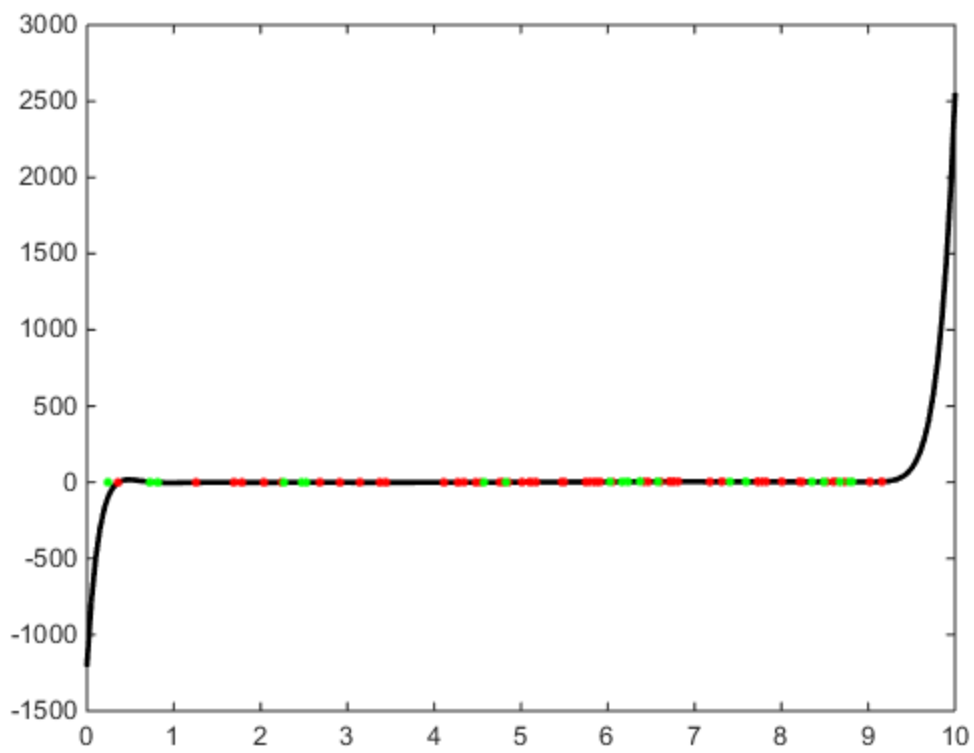
D = 5



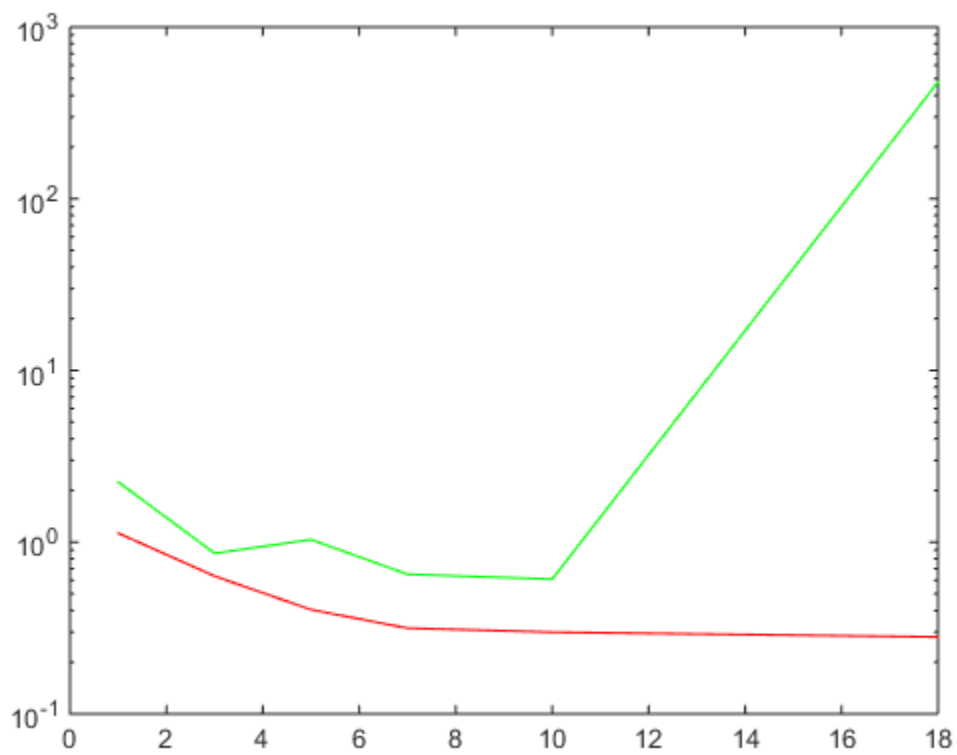
D =7



D =10



$D = 18$



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