

# Dr. Leon VanDommelen, Exam 1, 10/04/18, Question 2

## Table of Contents

Initialize .....	1
My Solution: .....	1

### IMPORTANT:

Do not change **anything** in this header! Put the solution to the question completely at the end of the file.

### Initialize

format compact  
more off

### My Solution:

*Handwritten notes:*

- (5) create data xVals (5) max error (4) plot
- (5) polyfit (2) fprintf (2) symbols, lines, colors
- (5) polyval (Harder) (3) polyder (2) axes
- 15 10 9

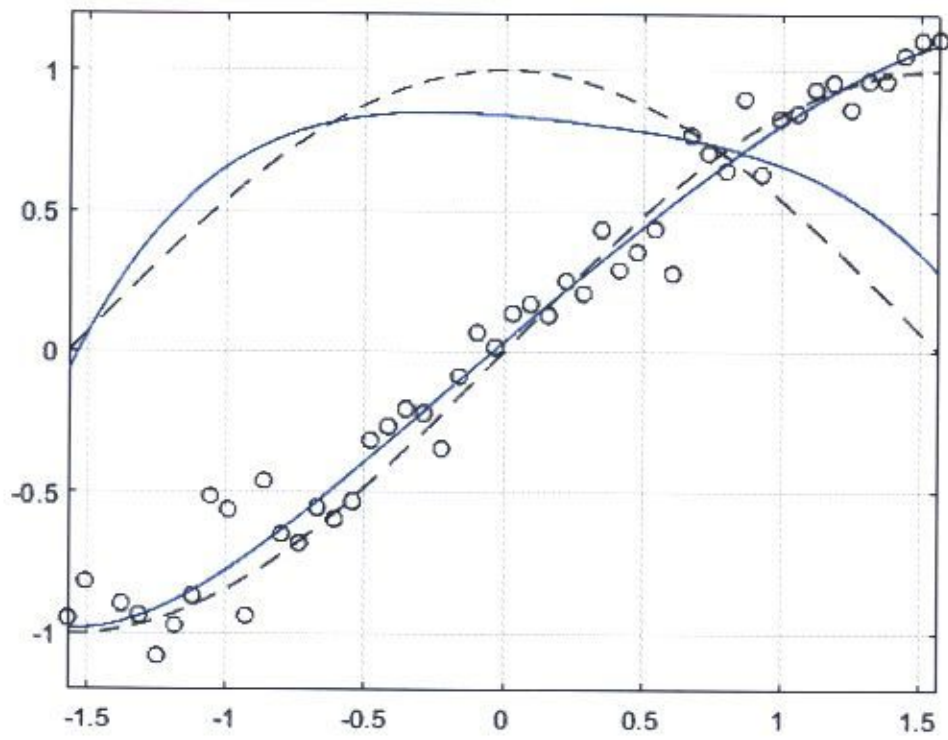
```
% create noisy data
xVals=linspace(-pi/2,pi/2,50);
rng('default')
fVals=sin(xVals)+0.1*randn(size(xVals));

% create fit
CoefQuintic=polyfit(xVals,fVals,5);

% maximum error at the plot points
xPlot=linspace(-pi/2,pi/2,100);
fQuinticPlot=polyval(CoefQuintic,xPlot);
errQuintic=max(abs(fQuinticPlot-sin(xPlot)));
fprintf('The quintic fit has a maximum error %.2E\n',errQuintic)

% plot
fExactPlot=sin(xPlot);
derfExactPlot=cos(xPlot);
derCoefQuintic=polyder(CoefQuintic);
derfQuinticPlot=polyval(derCoefQuintic,xPlot);
plot(xPlot,fExactPlot,'--k',...
      xVals,fVals,'ok',...
      xPlot,derfExactPlot,'--k',...
      xPlot,fQuinticPlot,'b',...
      xPlot,derfQuinticPlot,'b')
grid on
axis([-pi/2 pi/2 -1.2 1.2])
```

The quintic fit has a maximum error 9.50E-02



*Published with MATLAB® R2017b*