

Use a function of your choice to complete this problem.

- a. For your function  $f$ , generate data according to  $y_i = f(t_i) + \epsilon_i$  where  $\epsilon$  is Gaussian noise with zero mean and standard deviation 0.1. Fit the resulting data using ordinary least squares and the monomial basis up to  $t^8$
- b. Repeat the fitting above 1000 times (generating new data each time) and create histograms for the value of each  $\theta$
- c. Repeat the previous two parts using the first eight Legendre polynomials
- d. What can you conclude about the advantages and disadvantages of using monomials versus Legendre polynomials as basis functions?