Nonparametric Statistics Homework VI.

Due date: December 10 2:30pm. 1%/hour deduction afterward. Worth 6% of your final grade.

1. Using the Cavendish data, estimatethe probability density of the measurements using spline. Compute the expected density of the earth. Test if the density of earth is 5.46. What is the P-value? Hint: you may need to generate bins and smooth the bin heights with splines. The data file is at http://www.stat.wisc.edu/ mchung/teaching/data/earth.data.
2. Do Problem 1 with using Fourier series expansion.
3. Let $Y_1 = 0, Y_2 = 2, Y_3 = -1, Y_4 = 4$. Find cubic curve $\mu(t)$ that minizes

$$\frac{1}{4}\sum_{i=1}^{4} \big(Y_i - \mu(i)\big)^2 + \lambda \int_1^4 \mu''(t)\, dt$$

for $\lambda = 0, 1$ and 1000 (warning: MATLAB cublic spline minimizes a slightly different function).