

Problem Set 4

Due Tuesday, November 3.

1. Consider the multiple regression model with Gaussian errors:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i.$$

Compute the Wald statistic for the following nonlinear hypothesis:

$$\beta_0^2 + \beta_1 \beta_2 = 9$$

- a. Using the data in ps4_delta.wf1, parametrically bootstrap the Wald test of the nonlinear hypotheses. Use the bootstrap critical values to test the null.
- b. Compare your results in part a with what you would find if you assumed that the asymptotic distribution of the Wald tests was valid in finite samples.

2. Consider the following nonlinear regression function:

$$y_i = \beta^2 x_{1i} + \sqrt{\beta} x_{2i} + u_i,$$

where $u_i \sim iid(0, \sigma^2)$. Using the data in ps4.wf1, write a Gauss program to compute the Gauss-Newton NLS estimate of β . Choose $\beta^1 = 1$ as your starting value. Specify a maximum of 500 iterations, and a convergence criterion of 10^{-5} . Report the NLS estimate of β , as well as its 95% asymptotic confidence interval.