

PS C236A/ Stat C239A
Problem Set 8
Due: November 9, 2009

Problem 1 Using the simulated data in the data frame `exercise1`, estimate the parameters α , β_1 , β_2 , and β_3 in the model $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$. Use the parametric bootstrap to calculate 95% confidence intervals for each of the estimated parameters, as well as the variance-covariance matrix of these estimates.

Problem 2 Data frame `exercise2` contains simulated data generated from the following model:

$$y_t = \alpha + \rho y_{t-1} + \epsilon_t$$

where

$$y_0 = 0 \\ |\rho| < 1$$

The ϵ_t are iid with mean 0 and variance σ^2 .

- Explain why in this case you cannot use the non-parametric bootstrap to estimate the bias and standard errors for $\hat{\alpha}$ and $\hat{\rho}$.
- Can you use the parametric bootstrap? If you can, what assumption must you make for it to be valid?
- If you decide that the parametric bootstrap would be valid in this case, calculate bootstrapped standard errors and bias for $\hat{\alpha}$ and $\hat{\rho}$.