

Stat 557: HW1, due Feb 1st

1. Download the data from the website (math.unm.edu/~james) for hw1.

(a) Try to find the approximate MLE by optimizing all parameters simultaneously. Report your estimate, $(\hat{\beta}_0, \hat{\beta}_1, \hat{\tau}, \hat{\theta})$. All parameter values are between 0 and 1.

(b) Try first finding β_0 and β_1 using least squares and ignoring the error term (i.e., just estimate them using a simple linear regression model—the parameter estimates you get using `lm()` in R will be least squares estimates). Then treating those values as known, use maximum likelihood to estimate (τ, θ) . You can still estimate these parameters by evaluating the likelihood (or log-likelihood) numerically. How does your estimate vary from part (a)? Comment on whether this approach was easier than in part (a).

(c) For the two methods in parts (a) and (b), report the sum of squared residuals

$$\sum_{i=1}^n (y_i - \hat{y}_i)^2$$

and comment on what you observe.

2. Find the typo on page 11. (The point here is partly to encourage reading the book....)

3. Do problem 1.5

4. Do problem 1.6.