

Assignment 2 – Addition to question 5, Maximum likelihood with cities.

For the section: Prove that whatever is b , log-likelihood is maximized when $a =$

$$\min(x_1, \dots, x_n)$$

- $\ln(a)$ is monotonically increasing. So in order to maximize the likelihood we need to set a as high as possible.

For $x < a$ the pdf is 0. So if there is x_i so $x_i < a$ then $\prod_{i=1}^n \frac{a^b b}{x_i^{b+1}}$ will be 0. In that

case the likelihood function will be 0, and log-likelihood is undefined. So for all

$i: a \leq x_i$.

Since $a \leq x_i$ for all i , we maximize the likelihood by setting a to the smallest x_i in the sample which is $\min(x_i)$.