

39. The independent random variables X_1, \dots, X_n have common CDF

$$P(X_i \leq x) = \begin{cases} 0 & x \leq 0 \\ \left(\frac{x}{\beta}\right)^\alpha & 0 < x < \beta \\ 1 & x \geq \beta \end{cases}$$

Assume α is known.

- (a) Show the distribution is a scale family (α is known).
- (b) Suppose α is a known constant, use the MLE to construct a pivot to find an upper confidence bound for β with confidence coefficient 0.95.