

Math 483, Fall 2019. Homework 7
Due October 24.

NAME -----

From the book: Chapter 9, problem 2 (a-c)

Problem A. For X_1, \dots, X_n from the geometric distribution with PMF

$$f(k, p) = (1 - p)^{k-1}p, \quad k = 1, 2, 3, \dots$$

- (a) Find the MLE for p .
- (b) Find the Fisher information.

Problem B. For X_1, \dots, X_n from the *offset Exponential* distribution with density

$$f(x; \theta) = \begin{cases} \frac{1}{\beta} e^{-\frac{x-c}{\beta}}, & x \geq c \\ 0, & \text{otherwise} \end{cases}$$

- (a) Find the MLE for $\theta = (\beta, c)$
- (b) Does the Fisher information exist? Explain.

Problem C. This exercise is to illustrate the equivariance principle. Let X_1, \dots, X_n be drawn from Normal distribution with mean 0 and st.dev. σ . Calculate the MLE for

- (a) Parameter $\theta = \sigma$.
- (b) Parameter $\psi = \ln \sigma$, directly minimizing the log-likelihood function.
Show that $\hat{\psi} = \ln \hat{\theta}$.