

Suggested Problems 3

- (1) Let $X_n \stackrel{iid}{\sim} f_\theta$ where

$$f_\theta(x) = \begin{cases} \theta & x = -1 \\ 2\theta & x = 0 \\ 1 - 3\theta & x = 1. \end{cases}$$

Find a method of moments estimator for θ .

- (2) Let $X_n \stackrel{iid}{\sim} \text{Beta}(\alpha, \beta)$. Find a method of moments estimator for α and β .

- (3) Let $X_n \stackrel{iid}{\sim} f_\theta$ where

$$f_\theta(x) = \theta x^{\theta-1} \text{ for } 0 < x < 1.$$

Find a MOM estimator for θ .

- (4) Let $X_n \stackrel{iid}{\sim} f_\theta$ where

$$f_\theta(x) = \theta(1-x)^{\theta-1} \text{ for } 0 < x < 1.$$

Find a MOM estimator for θ .

- (5) Let $X_n \stackrel{iid}{\sim} f_\theta$ where

$$f_\theta(x) = \theta(x - 1/2) + 1 \text{ for } 0 < x < 1.$$

Find a MOM estimator for θ .

- (6) Let $X_n \stackrel{iid}{\sim} \text{Poisson}(\lambda)$. Find a MOM estimator for λ .

- (7) Let $X_1, X_2, X_3 \stackrel{iid}{\sim} N(\theta, 1)$. Classify each of the following as either (1) sufficient, (2) ancillary, or (3) neither: (a) X_2 (b) $X_2 - X_3$, (c) $X_1 + X_2 + X_3$, (d) \bar{X} , (e) $X_{(3)}$.

- (8) Let $X_n \stackrel{iid}{\sim} \text{Geometric}(p)$ so that $f(x) = p(1-p)^{x-1}$ for $x = 1, 2, 3, \dots$. Find a MOM estimator for p .

- (9) Let $X_n \stackrel{iid}{\sim} U(\theta, \theta + 1)$. Find a MOM estimator for θ .