Exam 2
April 16, 2024

1. Let $Y_1, \ldots, Y_n$ be iid Uniform$(\theta,\ \theta + 1)$ random variables. Show that $\hat{\theta} = \overline{Y} - 1/2$ is a consistent estimator of θ.

2. Let $Y_1, \ldots, Y_n$ be iid Geometric(θ) random variables. Find the MLE of θ.

3. Let $Y_1, \ldots, Y_n$ be iid random variables, each with pdf

$$f_Y(y) = (\theta + 1)y^\theta, \quad 0 \leq y \leq 1$$

   (a) Find a sufficient statistic for θ.

   (b) Find the method of moments estimator of θ.

   (c) (Bonus) Find the MLE of θ.