Let $X_1, ---, X_n$ be a random sample from the pdf

$$f(x|\theta) = \theta x^{-2} \quad , 0 < \theta \le x < \infty$$

(a) What is the sufficient statistic for θ?

(b) Find MLE of θ?

2 Let $X_1, ---, X_n$ be iid with ~~pdf~~ one of 2 pdfs.

If $\theta = 0$, $f(x|\theta) = \begin{cases} 1 & \text{if } 0<x<1 \\ 0 & \text{ow} \end{cases}$

If $\theta = 1$,

$$f(x|\theta) = \begin{cases} \frac{1}{2\sqrt{x}} & \text{if } 0<x<1 \\ 0 & \text{ow} \end{cases}$$

Find MLE of θ.

3 The independent rvs $X_1, --- X_n$ have the common dist^{n}

$$P(X_i \le x | \alpha, \beta) = \begin{cases} 0 & \text{if } x<0 \\ \left(\frac{x}{\beta}\right)^{\alpha} & \text{if } 0 \le x \le \beta \\ 1 & x > \beta \end{cases}$$

$\alpha, \beta > 0$.

(a) Find the joint sufft stat for (α, β).

(b) MLE of α, β.

Let $x_1, \ldots, x_n$ be iid

$$f(x \mid \theta) = \theta x^{\theta - 1} \qquad 0 \le x \le 1$$

$$0 < \theta < \infty$$

(a) Find MLE of θ.

~~Show its variance~~

Let $x_1, \ldots, x_n$ be a sample from the inverse Gaussian pdf

$$f(x \mid \mu, \lambda) = \left(\frac{\lambda}{2\pi x^3} \right)^{1/2} \exp\left\{ \frac{-\lambda (x-\mu)^2}{2\mu^2 x} \right\}$$

$$x > 0$$

Show MLEs of μ and λ are

$$\hat{\mu} = \overline{X}$$

$$\hat{\lambda} = \frac{n}{\sum_{i=1}^{n} \left(\frac{1}{x_i} - \frac{1}{\overline{X}} \right)}$$