

## Suggested Problems 5

- (1) Let  $X_n \stackrel{iid}{\sim} \text{Geometric}(p)$  so that

$$f(x) = (1-p)^{x-1}p.$$

Find  $I_N(p)$ .

- (2) If  $X_n \stackrel{iid}{\sim} \text{Geometric}(p)$  what is  $I_N(\theta)$  where  $\theta = \log(p)$ ?  
(3) Let  $X_n \stackrel{iid}{\sim} N(0, \sigma^2)$ . What is  $I_N(\sigma)$ ?  
(4) For which of the following distributions does the following equality hold:

$$I(\theta) = -\mathbb{E} \left[ \frac{\partial^2}{\partial \theta^2} \log f(X) \right]?$$

- (a) *Exponential*( $\theta$ )  
(b) Shifted Exponential  $f(x) = e^{-(x-\theta)}$  for  $x > \theta$   
(c)  $N(\theta, 1)$   
(d)  $U(-\theta, \theta)$   
(e) *Beta*( $\theta, 2$ )  
(5) Let  $I(\lambda) = \frac{1}{\lambda}$ . Find a function  $g$  so that if  $\theta = g(\lambda)$  then  $I(\theta)$  is a constant function of  $\theta$ .