

**18.443. Pset 3.**

(1) Compute Fisher information  $I(\lambda)$  for a random variable with Poisson distribution  $\Pi(\lambda)$ .

(2) Compute Fisher information  $I(\alpha)$  for a random variable with normal distribution  $N(\alpha, \sigma^2)$ , assuming that  $\sigma^2$  is a known constant (this means that  $\alpha$  is the only parameter of the distribution).

(3) Show that Bernoulli distribution  $B(p)$  is an exponential-type distribution. Using this fact, find an efficient estimate of  $p$ .

(4) Show that normal distribution  $N(\alpha, \sigma^2)$  with given  $\sigma^2$  (this means you can assume that  $\sigma^2$  is a known constant, and  $\alpha$  is the only parameter of the distribution) is an exponential-type distribution. Using this fact, find an efficient estimate of  $\alpha$ .