

138. Suppose that  $X_i, i = 1, 2, \dots, n$  are IID Bernoulli( $p$ ).

- (a) Show that the variance of the MLE of  $p$  attains the Cramér-Rao Lower Bound.
- (b) For  $n \geq 4$ , show that the product  $X_1X_2X_3X_4$  is an unbiased estimator of  $p^4$ , and use this fact to find the best unbiased estimator of  $p^4$ .