

THE PENNSYLVANIA STATE UNIVERSITY  
Department of Economics

Economics 501  
Homework 8  
Oct. 28

Gallant  
Fall 2014

1. Find  $\alpha_0, \alpha_1, \alpha_2$  that minimize

$$\text{MSE}(\alpha_0, \alpha_1, \alpha_2) = \mathcal{E} \left( Y - \alpha_0 - \alpha_1 X - \alpha_2 X^2 \right)^2$$

2. Find the moment generating functions of the following densities.

- (a)  $f_X(x) = 1/c, \mathcal{X} = \{x : 0 < x < c\}$ .
- (b)  $f_X(x) = 2x/c^2, \mathcal{X} = \{x : 0 < x < c\}$ .
- (c) The negative binomial; see the Appendix.
- (d) The double exponential; see the Appendix.

3. Compute  $\mathcal{E}X$  and  $\text{Var}X$  for each of the following.

- (a)  $f_X(x) = \alpha x^{\alpha-1}, \mathcal{X} = \{x : 0 < x < 1\}, \Theta = \{\alpha : 0 < \alpha < \infty\}$ .
- (b)  $f_X(x) = 1/N, \mathcal{X} = \{x : x = 1, 2, \dots, N\}, \Theta = \{N : N = 1, 2, \dots\}$ .
- (c)  $f_X(x) = (3/2)(x-1)^2, \mathcal{X} = \{x : 0 < x < 2\}$ .