Econometrics Take Home Exam

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1 Problem

1a)

$$\ln L(\beta, X, Y) = \sum_i X_i'\beta - e^{X_i'\beta}Y_i - \ln(Y_i!)$$

$$S(\beta) = \frac{\partial \ln L}{\partial \beta'} = \sum_i X_i' - X_i e^{X_i'\beta}Y_i$$

$$H(\beta) = \frac{\partial^2}{\partial \beta' \partial \beta} = -\sum_i X_i X_i' \exp^{X_i'\beta} Y_i$$

$$I(\beta) = -E(H(\beta)) = nE(X_i X_i' e^{X_i'\beta})$$

1f)

$$PE(X_i) = \frac{\partial E(Y_i/X_i)}{\partial LWAGE_i} = \frac{\partial \frac{1}{\lambda_i}}{\partial LWAGE_i} = \frac{\partial \frac{1}{\lambda_i}}{\partial X_i^7} = -\beta_7 \exp(-X_i'\beta) = \frac{-\beta_7}{\lambda_i}$$

Where X_i^7 denotes the seventh value of the vector X_i.