SDS 385: Homework 2

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Problem 1.   SGD for logistic regression

(A) In part (A) of the last homework we proved that the gradient of the negative log-likelihood can be expressed as

$$\nabla l(\beta) = -\sum_{i=1}^{n} \{x_i(y_i - m_i w_i)\} = \sum_{i=1}^{n} g_i(\beta)$$

where

$$g_i(\beta) = x_i(y_i - m_i w_i) = x_i(y_i - \hat{y}_i)$$

and

$$\hat{y}_i = \mathbb{E}(y_i|\beta) = m_i w_i(\beta) = m_i \frac{1}{1 + \exp(-x_i^T \beta)}.$$

(B)

(C)

(D)

(E)