Problem 1

Tuesday, June 11, 2024 3:46 PM

1) Prove (4.2) = (4.3)

(4.2) = $p(X) = \frac{e^{\beta_0+\beta_1 X}}{1+e^{\beta_0+\beta_1 X}}$

(4.3) $\frac{p(x)}{1-p(x)} = e^{\beta_0+\beta_1 X}$

let $q = e^{\beta_0+\beta_1 X}$

(4.2) = $p(x) = \frac{q}{1+q}$

$\frac{1}{p(x)} = \frac{1+q}{q}$

$\frac{1}{p(x)} = \frac{1}{q} + 1$

$\frac{1}{p(x)} - 1 = \frac{1}{q}$

$q = \frac{1}{\frac{1}{p(x)} - 1}$

$q = \frac{1}{\frac{1}{p(x)} - \frac{p(x)}{p(x)}}$

$q = \frac{1}{\frac{1-p(x)}{p(x)}}$

$q = \frac{p(x)}{1-p(x)}$

(4.3) = $e^{\beta_0+\beta_1 X} = \frac{p(x)}{1-p(x)}$

$\therefore$ 4.3 = 4.2 ✓