

# Empirical likelihood for linear models

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Observations:

$$z_1 = (x_1, y_1), z_2 = (x_2, y_2), \dots, z_n = (x_n, y_n).$$

Scoring function:

$$g(z_i, \theta) = x_i(y_i - x_i^\tau \beta).$$

Empirical likelihood function:

$$L(z, \beta) = \prod_{i=1}^n \frac{1}{1 + m^\tau g(z_i, \beta)},$$

where  $m$  is the solution of the following equation:

$$f(m, \beta) = \sum_{i=1}^n \frac{g(z_i, \beta)}{1 + m^\tau g(z_i, \beta)} = 0. \quad (1)$$

$-2 \log L$  is

$$\ell(\beta) = 2 \sum_{i=1}^n \log\{1 + m^\tau g(z_i, \beta)\}. \quad (2)$$