Вариант 11

МНК найти оценки параметров след. модели

$$y_t = \beta(1 + x_t) + \varepsilon_t = \beta + \beta x_t + \varepsilon_t$$

$$F = \sum_{n=1}^{n} (y_t - (\beta + \beta x_t))^2 \to min$$

Необх. усл. экстремума:

$$\frac{\partial F}{\partial \beta} = -2 \sum_{t=1}^{n} (1 + x_t)(y_t - \beta - \beta x_t) = 0$$

$$\sum_{t=1}^{n} (y_t + x_t y_t - \beta - \beta x_t - \beta x_t - \beta x_t^2) = 0$$

$$\sum_{t=1}^{n} y_t + \sum_{t=1}^{n} x_t y_t = \beta n + \beta \sum_{t=1}^{n} x_t + \beta \sum_{t=1}^{n} x_t + \beta \sum_{t=1}^{n} x_t^2$$

$$\sum_{t=1}^{n} y_t + \sum_{t=1}^{n} x_t y_t = \beta (n + 2 \sum_{t=1}^{n} x_t + \sum_{t=1}^{n} x_t^2)$$

$$\boxed{\beta = \frac{\sum_{t=1}^{n} y_t + \sum_{t=1}^{n} x_t y_t}{n + 2 \sum_{t=1}^{n} x_t + \sum_{t=1}^{n} x_t^2}}$$