Classwork 13: Trend Stationary Processes

EC 421

2022-11-15

1) Show that y_t is nonstationary when $y_t = \beta_0 + \beta_1 t + u_t$, where $u_t \sim$ iid N(0, σ^2).

2) Suppose x_t and y_t are unrelated except that they both have time trends, so

$y_t = \alpha_0 + \alpha_1 t + w_t$

$x_t = \gamma_0 + \gamma_1 t + v_t$

Where w_t and v_t are iid N(0, 1). If we estimate the model $y_t = \beta_0 + \beta_1 x_t + u_t$, why do we often conclude that $\beta_1 \neq 0$? What will the sign of $\hat{\beta}_1$ be?

3) In the previous problem, should we expect that as the number of

observations t increases, we find that x seems to have an effect on y less often?

For 2 points of extra credit: do a monte carlo simulation in R using `map` that answers this question.