On Unit Root Test (cont.)

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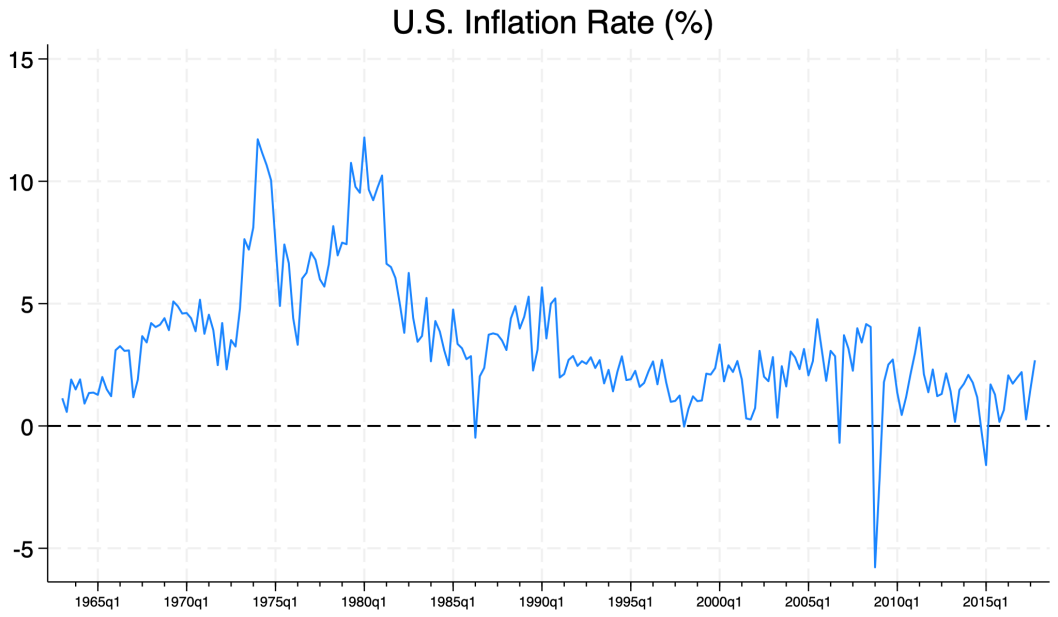
Plot values of `Infl` from 1963:Q1 through 2017:Q4. Do you think that `Infl` has a stochastic trend?

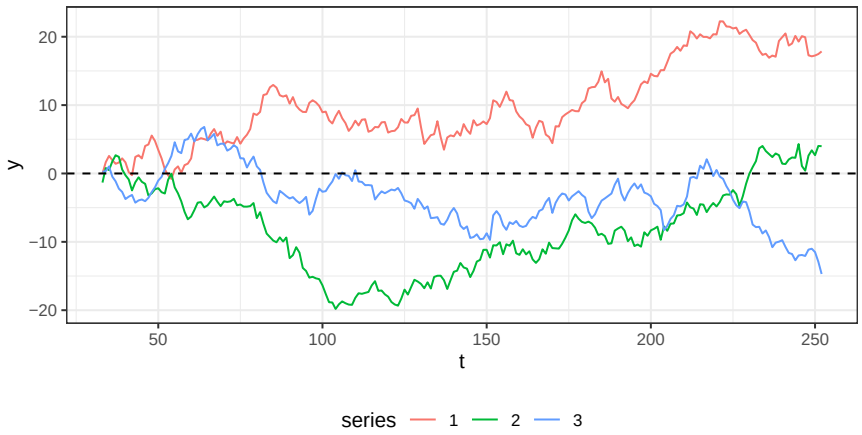


Several possible time series

DGP(1): Nonstationary series

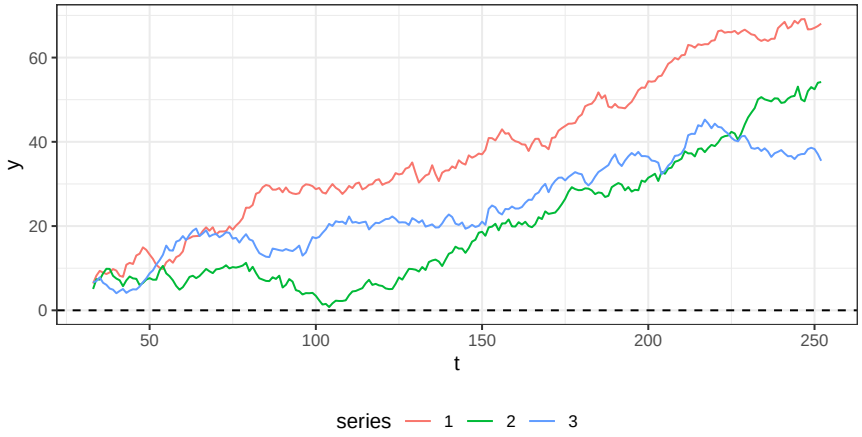
DGP(1a): Random walk without drift

$$y_t = y_{t-1} + \epsilon_t; \quad \epsilon_t \sim N(0,1)$$



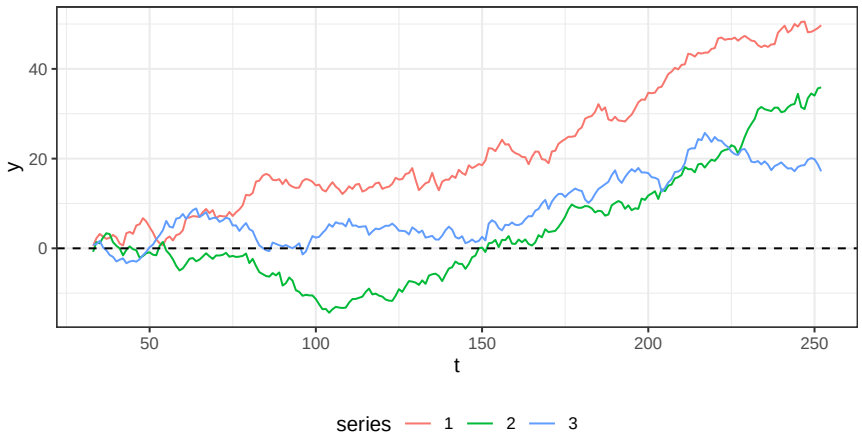
DGP(1b): Random walk with a drift

$$y_t = 0.2 + y_{t-1} + \epsilon_t, \quad \epsilon_t \sim N(0,1)$$



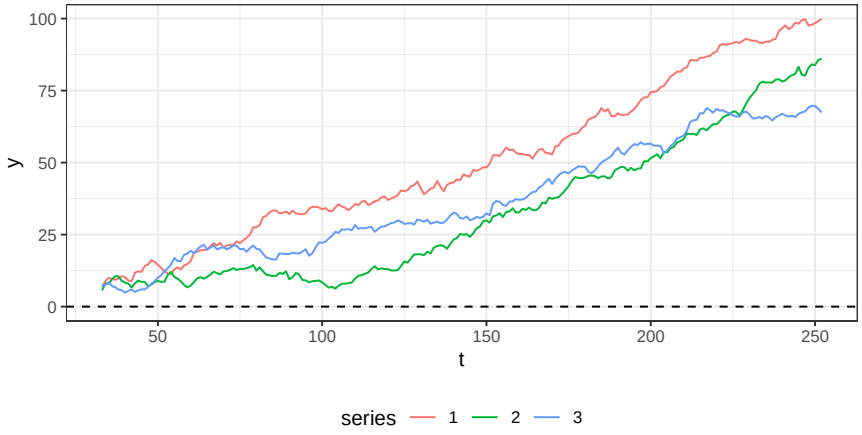
DGP(1c): Random walk with a trend term

$$y_t = 0.001 \cdot t + y_{t-1} + \epsilon_t; \quad \epsilon_t \sim N(0,1)$$



DGP(1d): Random walk with a drift and a trend

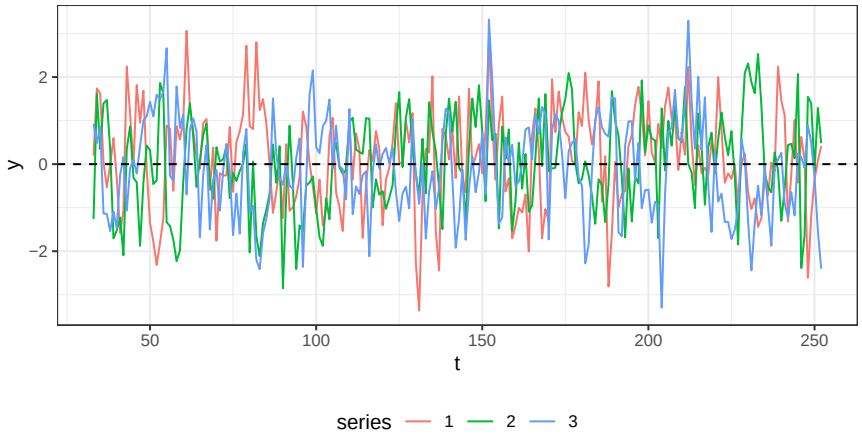
$$y_t = 0.2 + 0.001 \cdot t + y_{t-1} + \epsilon_t; \quad \epsilon_t \sim N(0,1)$$



DGP(2): Stationary series

DGP(2a): Stationary AR(1)

$$y_t = 0.4 \cdot y_{t-1} + \epsilon_t; \quad \epsilon_t \sim N(0,1)$$



DGP(2b): Stationary AR(1) with a deterministic trend

$$y_t = 0.02 \cdot t + 0.4 \cdot y_{t-1} + \epsilon_t; \quad \epsilon_t \sim N(0,1)$$