1: First order Difference equations

Denote w_t your salary at time t and y_t your total wealth at time t. The dynamic of your total wealth is given by:

$$y_t = y_{t-1} + w_t \tag{1}$$

In each period, your total wealth is the sum of the total wealth in the previous and the current salary.

(a) If you start working in 2018, what is your total wealth in 2050?

(b) Now suppose thanks to your hard working, you receive a bonus of 20 million VND in 2020. How much your total wealth in 2050 increases?

(c) Instead of receiving a bonus in 2020, you get promoted and your annual salary increases by 5 millions VND. How much your total wealth in 2050 increases?

(d) Because of inflation, the total wealth does not keep the same value in the future. Suppose the new dynamic of your total wealth is:

$$y_t = 0.5y_{t-1} + w_t \tag{2}$$

Answer questions, (a) (b) and (c) in this case.

2: Lag operator

(a) Develop $(1 - 0.2L + 0.5L^2 - 0.3L^3)y_t$

(b) Develop $(1 - 0.3L)^{-1}y_t$

(c) Develop $[(1 - 0.3L)(1 - 0.2L)]^{-1}y_t$

(d) Develop $[1 - L + 0.25L^2]^{-1}y_t$