Difference Equations

Mathematics for Economists, Fall 2023-24

Homework Exercises Set 2

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1 Solve the following first order difference equations and determine the dynamic behaviour of y_t:

a) $2y_{t+1} + 3y_t + 2 = 0$; $y_0 = 1$

b) $y_{t+1} - \frac{1}{2}y_t = t + 3$; $y_0 = 3$

2 Solve the following second order difference equations and determine the dynamic behaviour of y_t:

a) $y_{t+2} - 5y_{t+1} + 6y_t = 4^t$; $y_0 = 1$; $y_1 = 2$

b) $y_{t+2} - 4y_{t+1} + 3y_t = t^2 + 2t$; $y_0 = 1$; $y_1 = 2$

3 Solve the following 2*2 system of difference equations in y_t,x_t:

$$\left\{ \begin{array}{c} y_{t+1} + 2x_{t+1} = y_t \\ x_{t+1} = 2y_t + x_t + a^t \end{array} \right\}$$