

Definition (Discrete-time linear systems). A discrete-time linear time-invariant proper open system is defined by three matrices **A**, **B**, **C**. Together they give a recurrence of the type

$$\begin{aligned}x_{k+1} &= \mathbf{A}x_k + \mathbf{B}u_k \\y_k &= \mathbf{C}x_k\end{aligned}$$

If x has dimension $n \geq 1$, u dimension $m \geq 1$ and y dimension $p \geq 1$, then **A** has dimension $n \times n$, **B** has dimension $n \times m$, and **C** has dimension $p \times n$.