



Definition

A *continuous-time time-invariant linear dynamical system* is a tuple (A, B, C, D) where $A \in \mathbf{R}^{n \times n}$, $B \in \mathbf{R}^{n \times m}$, $C \in \mathbf{R}^{k \times n}$ and $D \in \mathbf{R}^{k \times m}$. Given an *input* $u : \mathbf{R} \rightarrow \mathbf{R}^m$, it models a *state* $x : \mathbf{R} \rightarrow \mathbf{R}^n$ and *output* $y : \mathbf{R} \rightarrow \mathbf{R}^k$ by

$$\begin{aligned}\dot{x} &= Ax + Bu, \\ y &= Cx + Du.\end{aligned}$$

Here Ax is called the *drift term* and Bu is called the input term (of \dot{x}).

