

# *Notes for ECE 30100 - Signals and Systems*

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## Introduction

A signal can be continuous time (CT) signal, which has an independent continuous variable indexed  $t \in \mathbb{R}$ , or discrete time (DT) which has a discrete independent variable indexed  $n \in \mathbb{N}(\mathbb{Z})$ .

$(.) \rightarrow CT$

$[.] \rightarrow DT$

A system, on the other hand, is something that transforms inputs into outputs.

$$input \rightarrow [\text{SYSTEM}] \rightarrow output$$

Another way this could be represented is:

$$system(input, t) = output$$

These can also be divided into CT and DT.

A CT system is of the form:

$$x(t) \rightarrow [CT] \rightarrow y(t)$$

On the other hand, a DT is of the form:

$$x[n] \rightarrow [DT] \rightarrow y[n]$$

*Note : For most of the course, continuous and discrete will be analyzed separately. That is, only a couple topics will have CT inputs with DT outputs, or DT inputs with CT outputs.*

*Note : Most of the analyzed systems we will be linear and time invariant.*