01 -- Tue Oct 6

ECE 447: Control Systems (Fall 2020)

Prof: Sam Burden   TA: Haonan Peng

* if/when possible: keep video on; unmute to ask Questions

* update your preferred name at identity.uw.edu

today: ☑ HW0 assigned – due Fri Oct 9

☑ week 1 lectures posted (~2.5 hours)

☐ office hour   TODO: 1f audio cut out

→ Colaboratory notebook

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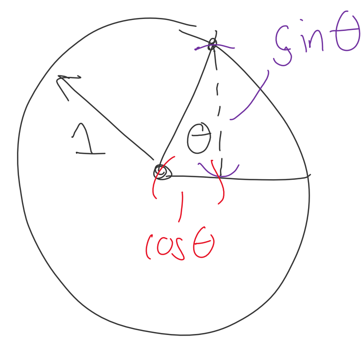
c. Consider the functions $f : X \to Y, g : Y \to Z$.

Note: if you are unfamiliar with this notation, it is a compact way to say "f is a rule that assigns a unique value $f(x)$ in the set Y to each element x in the set X". You may be more familiar with the notation $y = f(x)$ where $x \in X$ (that is, x is an element of the set X) and $y \in Y$ (that is, y is an element of the set Y). The set X is called the ***domain of*** f.

examples of functions:

- trigonometric function

$$\begin{array}{l} \quad (-\infty, \infty) \\ \quad\ \ \| \\ \sin : \mathbb{R} \to [-1, +1] \\ \quad\ : \theta \mapsto \sin\theta \end{array}$$



- LTI transformation

$$\xrightarrow{u} \boxed{H_{yu}} \xrightarrow{y} \qquad H_{yu} : \mathcal{U} \to \mathcal{Y}$$

transformation

eg convolution

$$u \in \mathcal{U} = \{ u : (-\infty, \infty) \to \mathbb{R} \}$$

$$: t \mapsto u(t)$$

$$y(t) = (h * u)(t)$$

$$= \int_{-\infty}^{\infty} h(t-\tau) \cdot u(\tau) \, d\tau$$

$$\mathbb{R}^{2\times 2} = \left\{ \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} : a_1, a_2, a_3, a_4 \in \mathbb{R} \right\}$$

$$\mathbb{R}^{n\times m} = \left\{ \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1m} \\ \vdots & & & \\ a_{n1} & & \cdots & a_{nm} \end{bmatrix} : \{a_{ij}\}_{i=1, j=1}^{i=n, j=m} \subset \mathbb{R} \right\}$$