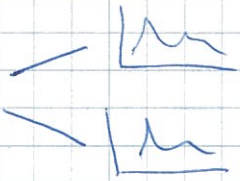
TIME / FREQUENCY DOMAIN



$\omega = 2\pi f$

$\Omega_k = e^{j\frac{2\pi k}{N}}$ ETC.

FOURIER TRANSFORMATION

$$X(\omega) = \int_{-\infty}^{\infty} x(t) e^{-j\omega t}\, dt$$

$$x(t) = \frac{1}{2\pi}\int_{-\infty}^{\infty} X(\omega) e^{j\omega t}\, d\omega$$

(INTEGRAL TRANSFORMATION)

$$X(k) = \frac{1}{\sqrt{N}} \sum_{n=0}^{N-1} x(n) e^{-j\frac{2\pi nk}{N}}$$

$$x(n) = \frac{1}{\sqrt{N}} \sum_{k=0}^{N-1} X(k) e^{j\frac{2\pi nk}{N}}$$

(DFT DISCRETE FOURIER TRANSFORM)

$\Rightarrow$ SAMPLED SIGNAL $\quad x(n) = x(nT_s) \quad T_s = 1/f_s$

$$\underline{x} = [x(0), x(1), \dots x(N-1)]^T$$

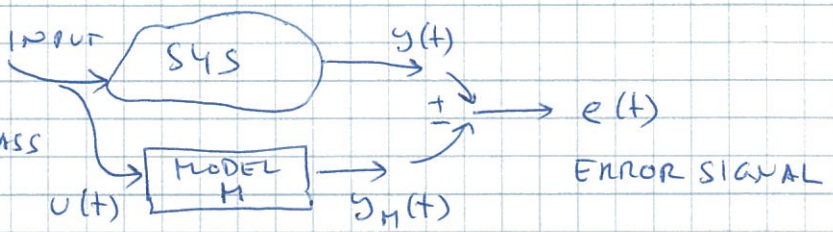
$$\underline{X} = [X(0), X(1), \dots X(N-1)]^T$$

$$\underline{X} = \underline{\underline{F}}_N \cdot \underline{x} \qquad \underline{\underline{F}}_N = \begin{bmatrix} 1 & 1 & 1 & \dots & 1 \\ 1 & w & w^2 & \dots & w^{N-1} \\ 1 & w^2 & w^4 & \dots & \\ \vdots & \vdots & & & \\ 1 & w^{N-1} & \dots & & \end{bmatrix}$$

$$w = e^{-j\frac{2\pi}{N}}$$

$$\left[\underline{\underline{F}}_N\right]_{ij} = w^{ij} \qquad i,j = 0,1,\dots,N-1$$

MODELS



MEM MODEL CLASS

MODEL CLASS:

- STRUCTURE + PARAMETERS: NONPARAMETRIC / PARAMETRIC $M(\underline{\theta})$
- LINEAR / NONLINEAR / LINEAR-IN-PARAMETERS (LINEAR REGRESSION)
- OPEN / CLOSE-LOOP
- STATIC / DYNAMIC