

ME 330 ~~Exam I~~ Final Exam Formula Sheet

$$\Sigma F = m \ddot{x} \quad \text{or} \quad \Sigma F - m \ddot{x} = 0$$

	Impedance
$\xrightarrow{i} \frac{+e-}{R}$	R
$\xrightarrow{i} \frac{+e-}{C}$	$\frac{1}{Cs}$
$\xrightarrow{i} \frac{+e-}{L}$	LS

Kirchoff's voltage law: $\Sigma E = 0$
 current $\Sigma i = 0$ at node

P-operators: $P_y = \frac{dy}{dt}$ $\int y dt = \frac{1}{s} y$ etc.

~~State space~~

State space model: $\dot{\bar{x}} = A \bar{x} + B \bar{u}$
 $\bar{y} = C \bar{x} + D \bar{u}$

Taylor series $f(x) \approx f(\bar{x}) + \left. \frac{df}{dx} \right|_{x=\bar{x}} (x - \bar{x}) + \frac{1}{2n^2} \ddot{x} + \frac{2\ddot{x}}{2n} \dot{x} + x = K u(t)$

Freq. Response

$$M(\omega) = |H(j\omega)|$$

$$\tau \dot{x} + x = K u(t)$$

$$\Phi(\omega) = \angle H(j\omega)$$

where $H(s) = \text{transfer func.}$