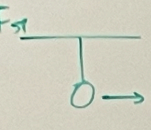
low A SEISMOMETER WORKS → MODEL A TRANSFER FUNCTION



$$F_{SP} = +M\ddot{x}_{PM} - B\dot{x}_{PM} - kx_{PM}$$

$$= M\left(-\ddot{x}_{PM} - \frac{B}{M}\dot{x}_{PM} - \frac{k}{M}x_{PM}\right)$$

$\frac{1}{i\omega}\dot{x}$

[FOURIER TRANSFORM
$x = Ae^{i\omega t}$
$\dot{x} = \dot{x}$
$\ddot{x} = -i\omega\dot{x}$
$\ddot{x} = +\omega^2 x$]

$$= M\left(\omega^2 x_M + i\frac{B}{M}\omega x_{PM} - \frac{k}{M}x_{PM}\right)$$

$$\frac{k}{M} \equiv \omega_0^2 \qquad B/M = \omega_0/Q$$

$$F_{SP} = M x_{PM}\left(\omega^2 + i\frac{\omega_0}{Q}\omega - \omega_0^2\right)$$

$$\frac{x_{PM}}{F_{ST}} = \frac{1}{M}\frac{1}{\left(\omega^2 + i\frac{\omega_0}{Q}\omega - \omega_0^2\right)}$$

$F = Mx$

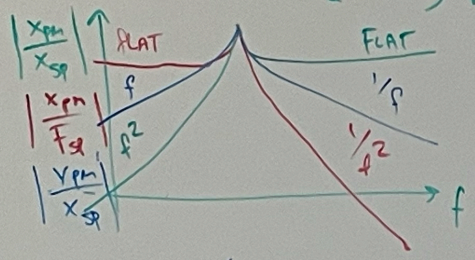
$F_{SP} = M\omega^2 x_{SP}$

$$\frac{x_{PM}}{M\omega^2 x_{SP}} = \frac{1}{M}\left(\quad\right)$$

$$H \equiv \frac{x_{PM}}{x_{SP}} = \frac{\omega^2}{\left(\omega^2 + i\frac{\omega_0}{Q}\omega - \omega_0^2\right)}$$

TWO ZEROS AT ZERO Hz

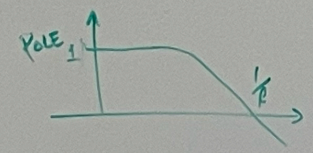
A COMPLEX PAIR OF POLES @ ω_0



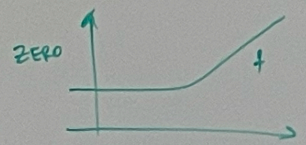
$1/2\zeta_T \approx 0.15$

POLE + ZERO NOTATION

$$H = \frac{(i\omega - z_1)(i\omega - z_2)\cdots(i\omega - z_n)}{(i\omega - p_1)(i\omega - p_2)\cdots(i\omega - z_n)}$$

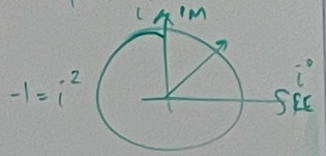


$$|H| = \frac{1}{\omega - p_1}$$



$$dB_{LIN} = 20\log_{10}\left(\frac{SIG}{REF}\right)$$

$$|H| = (\omega - z_1)$$



V_{IN}

V_{IN}