

Time Response*, ME451

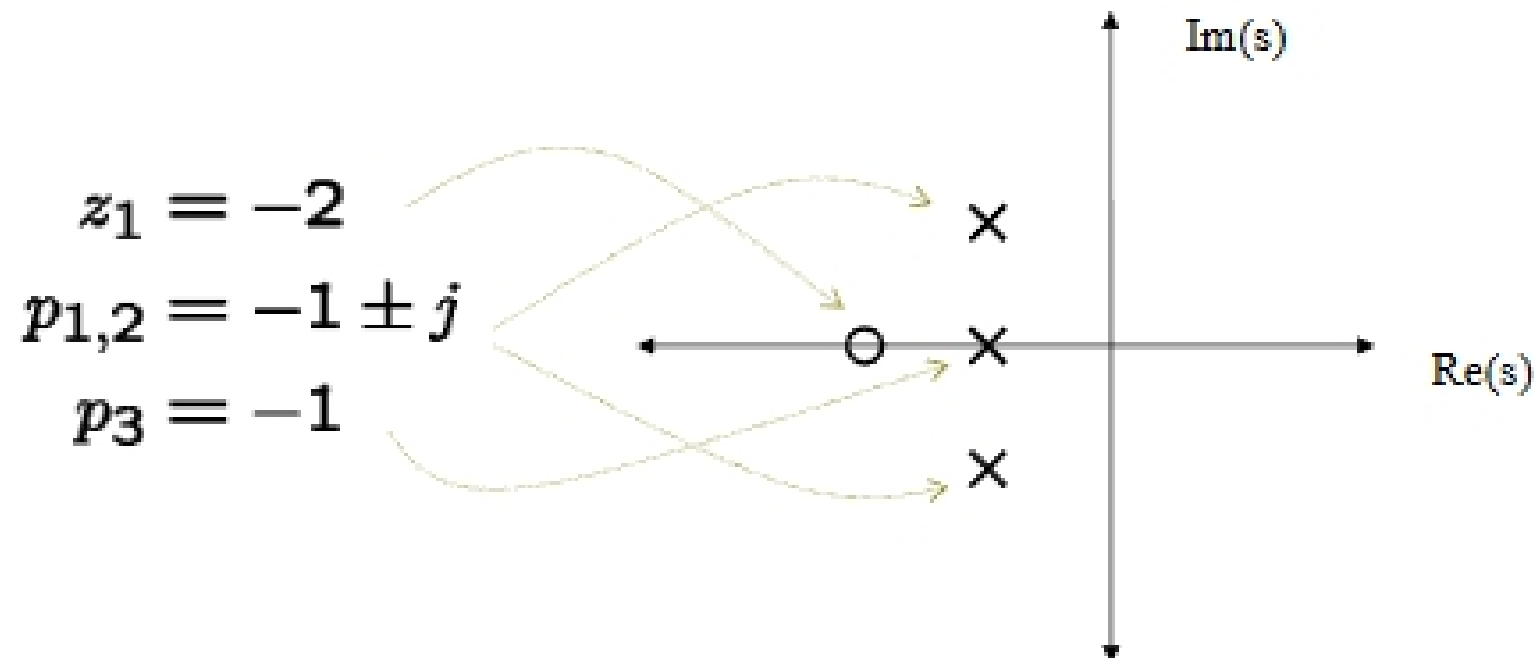
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* This presentation is created by Jongeun Choi and Gabriel Gomes

Zeros and poles of a transfer function

- Let $G(s)=N(s)/D(s)$, then
 - Zeros** of $G(s)$ are the roots of $N(s)=0$
 - Poles** of $G(s)$ are the roots of $D(s)=0$

$$G(s) = \frac{(s+2)}{(s+1+j)(s+1-j)(s+1)}$$



Theorems

- Initial Value Theorem

$$\lim_{t \rightarrow 0} x(t) = \lim_{s \rightarrow \infty} s\mathcal{L}(x(t))$$

- Final Value Theorem

– If all poles of $sX(s)$ are in the left half plane (LHP), then

$$\lim_{t \rightarrow \infty} x(t) = \lim_{s \rightarrow 0} s\mathcal{L}(x(t))$$