

Transfer Function

Laplace transform

$$\frac{V_o}{V_{in}} = H(s)$$

$H(s)$: real rational

$$H(s) = \frac{a_n s^n + \dots + a_0}{b_m s^m + \dots + b_0} = \frac{a_n \prod_{i=1}^n (s - s_{zi})}{b_m \prod_{j=1}^m (s - s_{pj})}$$

Zeros: no output

Poles: output for no input

Real part $\sigma_{pi} < 0$

Order: total # of poles =
zeros

Order = # of Ls and Cs
- loops & cutsets of
Ls & Cs