

## Bode plot

$$H(s) = \frac{100 s+1}{(s+10)(s+100)} = \frac{100 (s+1)}{s^2 + 110s + 1000}$$

Solution 1) Rewrite in proper form

$$H(s) = \frac{100 s+1}{10 \cdot 100 (s/10+1)(s/100+1)} = 0.1 (s+1) / (s/10+1)(s/100+1)$$

2) Separate the transfer func<sup>n</sup> into constituent parts

Constant 0.1

pole at  $s = -10$

pole at  $s = -100$

zero at  $s = -1$

3) constant = 0 -20dB phase is constant at 0 degrees

pole = 10 rad/sec - 0 dB upto break  $\omega$ , then drops off with a slope of -20dB/sec

phase is 0 upto  $1/10$  of break  $\omega$ , then linearly drops down to -90°

pole at 100 rad/sec - 0 dB upto break  $\omega$ , then drops off with a slope of -20dB/sec

phase is 0 degrees upto  $1/10$  of break  $\omega$  then drops linearly to -90° at 10 times this break  $\omega$

zero at 1 rad/sec - 0 dB upto br  $\omega$ , then rises at

20dB/dec. The phase is 0 degrees up to  $1/10$  of break  $\omega$  then rises to 90°, at 10 times the br frequency.