

Note on the Scale

Vertical axis on magnitude plots:

we will also use logarithmic scale, just like the frequency axis.

Reason:

$$|(M_1 e^{j\phi_1})(M_2 e^{j\phi_2})| = M_1 \cdot M_2$$

$$\log(M_1 M_2) = \log M_1 + \log M_2$$

— this means that we can simply *add* the graphs of $\log M_1(\omega)$ and $\log M_2(\omega)$ to obtain the graph of $\log(M_1(\omega)M_2(\omega))$, and graphical addition is easy.

Decibel scale:

$$(M)_{\text{dB}} = 20 \log_{10} M \quad (\text{one decade} = 20 \text{ dB})$$