Lec 6

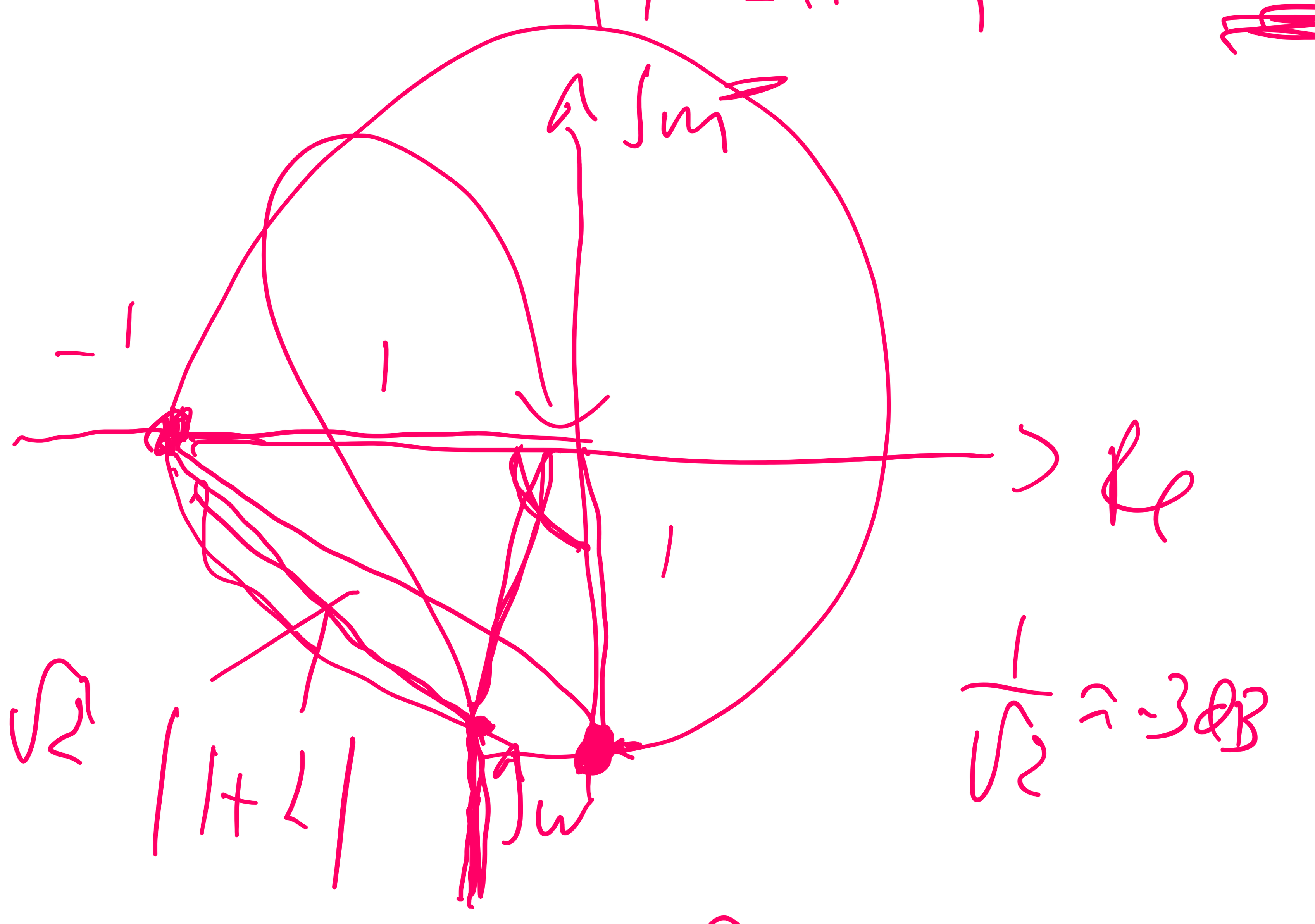
Tuesday 13. October 2020 21.38

$$\omega_B < \omega_c < \omega_{BT}$$

$$|L(j\omega_c)| = 1$$

$$|T(j\omega_c)| = \left|\frac{L(j\omega_c)}{1+L(j\omega_c)}\right| = \frac{|L(j\omega_c)|}{|1+L(j\omega_c)|}$$

$$= \frac{1}{|1+L(j\omega_c)|} = |S(j\omega_c)|$$



$$\frac{1}{\sqrt{2}} \approx -3dB$$

$$|1+L(j\omega_c)| < \sqrt{2} \qquad \omega_B < \omega_c$$

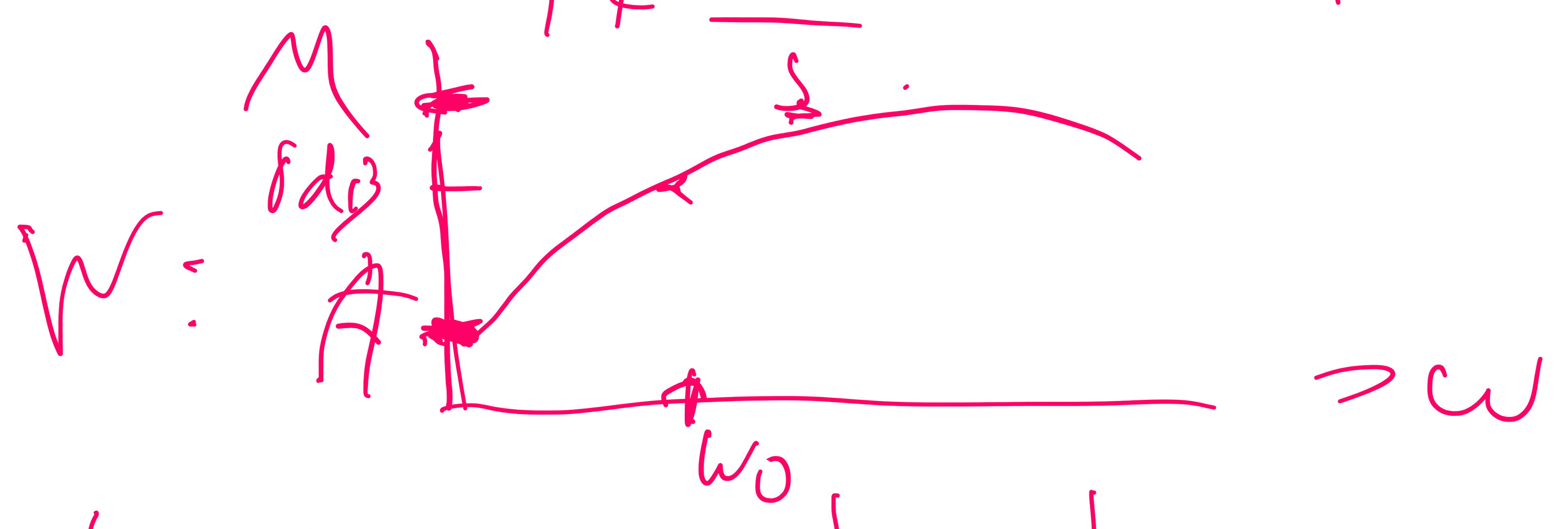
$$|S(j\omega_c)| > \frac{1}{\sqrt{2}} \qquad < \omega_{BT}$$

$$= |T(j\omega_c)|$$

$$\frac{1}{w_P} = \frac{\frac{s}{M} + \omega_0}{s + \omega_0 A}$$

$$s \to 0 \qquad \longrightarrow \frac{\omega_0}{\omega_0 A} = \frac{1}{A}$$

$$s \to \infty \qquad \frac{\frac{1}{M} + \frac{\omega_0}{s}}{1 + \frac{\omega_0 A}{s}} \longrightarrow \frac{1}{M}$$



$$\left|\frac{\frac{s}{M} + \omega_0}{s + \omega_0 A}\right| \longrightarrow \left|\frac{\omega_0 + j\frac{\omega}{M}}{\omega_0 A + j\omega}\right|$$

$$= \frac{\sqrt{\omega_0^2 + \left(\frac{\omega}{M}\right)^2}}{\sqrt{(\omega_0 A)^2 + \omega^2}} = \sqrt{\frac{\omega_0^2 + \frac{1}{M^2}\omega_0^2}{\omega_0^2 + \omega_0^2 A^2}}$$

$\omega = \omega_0$

$$= \sqrt{\frac{\omega_0^2\left(1 + \frac{1}{M^2}\right)}{\omega_0^2(1 + A^2)}} = \sqrt{\frac{1}{1}} \approx 1$$

Bandwidth $\frac{1}{T}$, $\frac{1}{T} e^{-\frac{t}{T}}$

$$\frac{1}{1+Ts} \xrightarrow{s = j\omega} \frac{1}{1+Tj\omega}$$

$$\omega \sim \frac{1}{T}$$