

ECE 351 - 52

SIGNALS AND SYSTEMS 1

LAB 9

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0.1 H(jw) Magnitude Calculation

0.1.1 Original H(jw) Function

$$\frac{\frac{j\omega}{RC}}{(j\omega)^2 + \frac{j\omega}{RC} + \frac{1}{LC}}$$

0.1.2 Hand Calculation

$$|H(j\omega)| = \frac{\sqrt{(\frac{\omega}{RC})^2}}{\sqrt{\omega^2 + (\frac{\omega}{RC})^2 + (\frac{1}{LC})^2}}$$

$$|H(j\omega)| = \frac{(\frac{\omega}{RC})}{\sqrt{\omega^2 + (\frac{\omega}{RC})^2 + (\frac{1}{LC})^2}}$$

0.2 H(jw) Phase Calculation

$$\angle H(j\omega) = \angle \text{numerator}(j\omega) - \angle \text{denominator}(j\omega)$$

$$\angle H(j\omega) = \tan^{-1}(\frac{\omega}{RC}) - \tan^{-1}(\frac{\frac{\omega}{RC}}{\omega^2 + \frac{1}{LC}})$$