For the practical tank circuit shown in the figure

\[ R = 0.002 \, \Omega, \quad L = 2 \, H, \quad \text{and} \quad C = \frac{1}{50} \, F \]

a) Find the resonance frequency of the circuit

b) Find the quality factor of the circuit

\[ Q = \frac{1}{\omega L} = \frac{1}{\sqrt{2} \frac{1}{50}} = \sqrt{5} \, \text{rad/s} \]

**CHECK the assumption:**

\[ Q_{coil} = \frac{1 \times \frac{1}{\omega L}}{R_s} = \frac{\omega L}{R_s} = \frac{5 \times 2}{0.002} = 5000 \gg 1 \quad \text{assumption is good.} \]

b) We can approximate the circuit to

the new \[ R_e = \frac{L}{CR} = \frac{2}{\frac{1}{50} \times 0.002} = 50 \, k\Omega \]

\[ Q'' = \frac{Q}{R} = \frac{5000}{50} = 100 \]

Good Luck,
Dr. Ali Muqaibel