

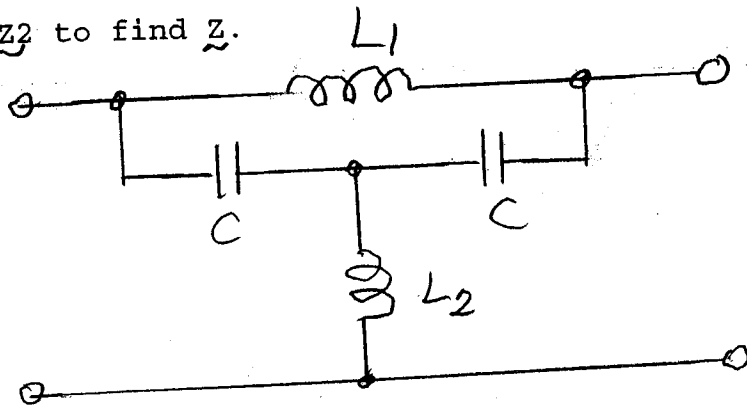
ECE 580
 FINAL EXAMINATION
 December 10, 2004
 1400 - 1600 pm

Open book

Prof. G. C. Temes.

1. Find the open-circuit impedance matrix \underline{Z} of the two-port T shown, in the following steps:

- a. Separate T into two series-connected simpler two-ports T1 and T2;
- b. Find the \underline{Z} matrices of T1 and T2;
- c. Add \underline{Z}_1 and \underline{Z}_2 to find \underline{Z} .



2. The gain G in the passband of a Butterworth filter must satisfy

$$-1.2 \text{ dB} < G < 0 \text{ dB} \quad \text{for } |f| < 0.5 \text{ MHz} .$$

The maximum pole-Q allowed is 3. How much stopband attenuation can be achieved at 1 MHz?

3. Find the transfer function $A_v(s) = V_{out}(s)/V_{in}(s)$ of the two-port shown. Assume $R = 5 \text{ k}\Omega$ and $G_m = 0.2 \text{ mS}$ for all transconductors, and use $C = 50 \text{ pF}$.

