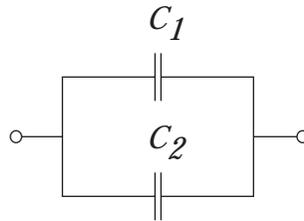


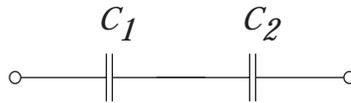
Problem S8 (Signals and Systems)

1. Using the constitutive law for capacitors and inductors, derive the equivalent capacitance and inductance for the following series and parallel configurations:

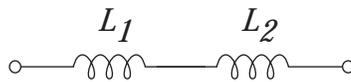
a)



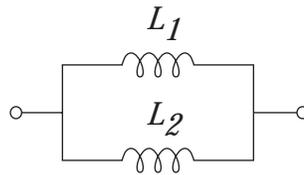
b)



c)

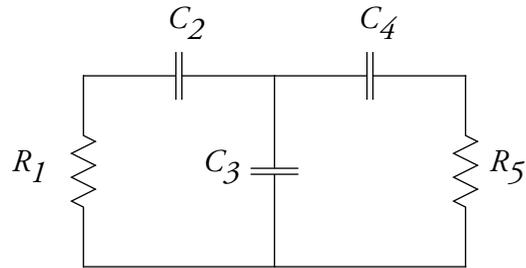


d)



(Problem continued on following page.)

2. Find a set of differential equations that describe the dynamics of the circuit below, using the node method



where

$$C_1 = 1 \text{ F}, \quad R_2 = 2 \text{ } \Omega, \quad C_3 = 2 \text{ F}, \quad C_4 = 4 \text{ F}, \quad R_5 = 5 \text{ } \Omega$$