ELECTRICAL ENGINEERING DEPARTMENT

EEL202 Circuit Theory

Major 1 - 3 pm 30/11/2006 MM: 45

Q1. Using Talbot's method, test if $Z(s)=\dfrac{36s^4+30s^3+24s^2+5s+1}{18s^3+6s^2+3s}$ is PR. If yes then realize it. (9)

Q2. Find the minimum real part of the function $Z(s)=\dfrac{6s^2+19s+18}{s^2+s+10}$. Is the minimum real part of $Z(s)$ same as that of its inverse? Is the frequency at which the real part of $Z(s)$ is minimum, the same as that for its inverse? (6)

Q3. Given that $\mathrm{Re}\{F(j\omega)\}=\dfrac{\omega^4+21\omega^2}{\omega^4+17\omega^2+16}$. Determine a realizable F(s). (5)

Q4. Determine the scattering parameters of the cascaded lattice network shown in Fig.1. Also find the insertion loss of this network. (6)

Q5. Synthesize the voltage transfer function $T(s)=\dfrac{V_2(s)}{V_1(s)}=\dfrac{K2s}{s^3+2s^2+2s+1}$ in two different ways using the transmission zeros method. Also find the realized value of *K*. (7)

Q6. Synthesize $Z(s)=\dfrac{s^2+s+1}{s^3+5s^2+2s+1}$ using the Brune's method. (7)

Q7. Obtain y-parameters of the twin-T network in Fig.2 using bisection theorem. (5)

-x-x-x- **All the best** -x-x-x-x-

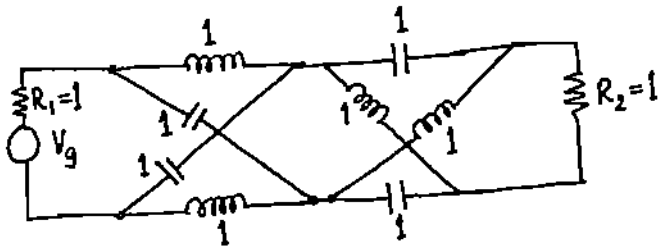

Fig.1

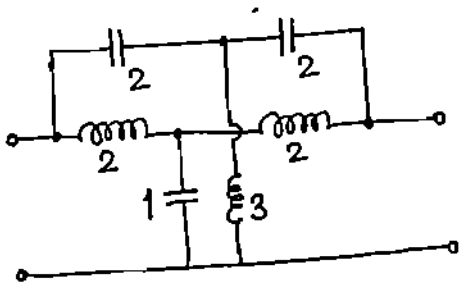

Fig.2