Solutions to Network Analysis by FF Kuo

Hrithik Singla and Amanullah Asad

January 28, 2021

Contents

Chapter 1

Signals and Systems

1.2 In signal processing, sampling is the reduction of a continuous-time signal to a discrete-time signal. A common example is the conversion of a sound wave (a continuous signal) to a sequence of samples (a discrete-time signal).(1) so, basically a sampler records the signal value at particular time intervals. Here the sampler records the signal $\sin(t)$ at intervals of $k\pi/4$ where k is an integer.

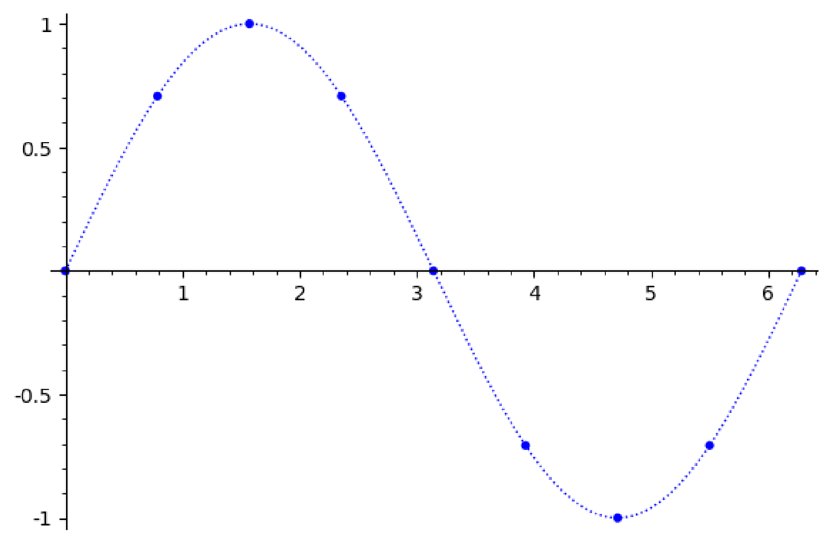

Figure 1.1: The Response of the sampler is plotted

1.5 (c)

$$z(s) = 3 + \frac{s}{s^2+2}$$
$$= 3 + \frac{1}{s + \frac{2}{s}}$$

The 3 represents a resistor of value 3Ω in series with another impedance z_{eq}

$$z_{eq} = \frac{1}{\frac{1}{z_1} + \frac{1}{z_2}}$$

parallel connection of z_1 and z_2

$$\frac{1}{z_{eq}(s)} = \frac{1}{z_1} + \frac{1}{z_2}$$

$\therefore$

$$z_1 = \frac{1}{s}, \quad z_2 = \frac{s}{2}$$

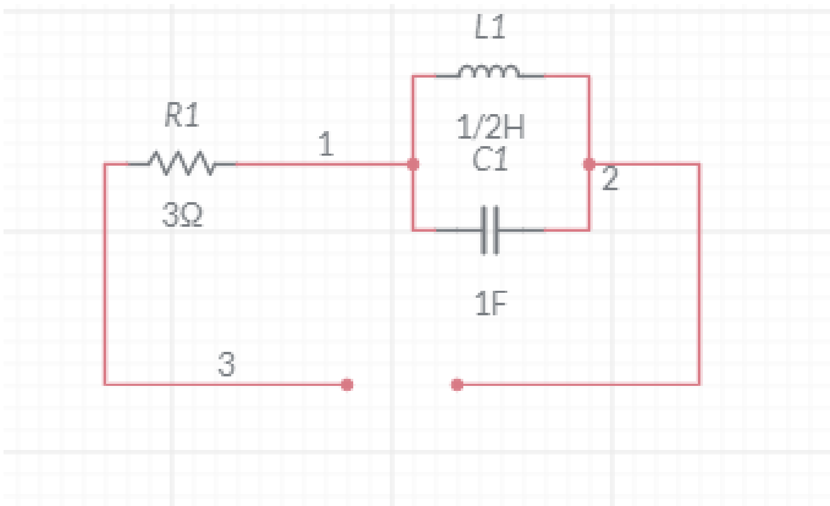

Figure 1.2: Network Realization for z(s)

1.5 (d)

$$y(s) = \frac{1}{3s+2} + \frac{2s}{s^2+4}$$

$$\frac{1}{z(s)} = \frac{1}{3s+2} + \frac{1}{\frac{s^2+4}{2s}}$$

which is similar to

$$\frac{1}{z_{eq}(s)} = \frac{1}{z_1} + \frac{1}{z_2}$$

$$z_1 = 3s+2 \quad z_2 = \frac{s}{2} + \frac{2}{s}$$

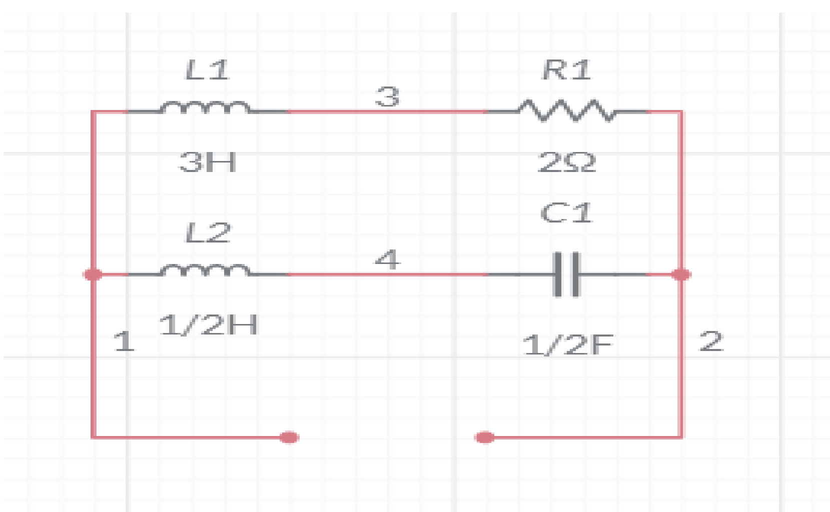

Figure 1.3: Network realization for y(s)

Bibliography

[1] Wikipedia contributors (2021): *Sampling (signal processing) — Wikipedia, The Free Encyclopedia*, [Online; accessed 19-January-2021].