

Filter Summary Report: TIA,simple,Z3,ZL

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Contents

1 Examined $H(z)$ for TIA simple Z3 ZL: $\frac{Z_3 Z_L g_m}{Z_3 g_m + Z_L g_m}$

$$H(z) = \frac{Z_3 Z_L g_m}{Z_3 g_m + Z_L g_m}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L R_3 s}{C_L L_L R_3 s^2 + L_L s + R_3}$$

Parameters:

Q: $C_L R_3 \sqrt{\frac{1}{C_L L_L}}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{1}{C_L R_3}$
 K-LP: 0
 K-HP: 0
 K-BP: R_3
 Qz: 0
 Wz: None

3.2 BP-2 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

$$H(s) = \frac{L_L R_3 R_L s}{C_L L_L R_3 R_L s^2 + L_L R_3 s + L_L R_L s + R_3 R_L}$$

Parameters:

Q: $\frac{C_L R_3 R_L \sqrt{\frac{1}{C_L L_L}}}{R_3 + R_L}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_3 + R_L}{C_L R_3 R_L}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_3 R_L}{R_3 + R_L}$
 Qz: 0
 Wz: None

3.3 BP-3 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

$$H(s) = \frac{L_L R_L s}{C_3 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

Parameters:

Q: $R_L \sqrt{\frac{1}{L_L (C_3 + C_L)}} (C_3 + C_L)$
 wo: $\sqrt{\frac{1}{L_L (C_3 + C_L)}}$
 bandwidth: $\frac{1}{R_L (C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: R_L
 Qz: 0
 Wz: None

3.4 BP-4 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

Parameters:

Q: $R_3 \sqrt{\frac{1}{L_L(C_3 + C_L)}} (C_3 + C_L)$
 wo: $\sqrt{\frac{1}{L_L(C_3 + C_L)}}$
 bandwidth: $\frac{1}{R_3(C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: R_3
 Qz: 0
 Wz: None

$$H(s) = \frac{L_L R_3 s}{C_3 L_L R_3 s^2 + C_L L_L R_3 s^2 + L_L s + R_3}$$

3.5 BP-5 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

Parameters:

Q: $\frac{R_3 R_L \sqrt{\frac{1}{L_L(C_3 + C_L)}} (C_3 + C_L)}{R_3 + R_L}$
 wo: $\sqrt{\frac{1}{L_L(C_3 + C_L)}}$
 bandwidth: $\frac{R_3 + R_L}{R_3 R_L (C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_3 R_L}{R_3 + R_L}$
 Qz: 0
 Wz: None

$$H(s) = \frac{L_L R_3 R_L s}{C_3 L_L R_3 R_L s^2 + C_L L_L R_3 R_L s^2 + L_L R_3 s + L_L R_L s + R_3 R_L}$$

3.6 BP-6 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, R_L \right)$

Parameters:

Q: $C_3 R_L \sqrt{\frac{1}{C_3 L_3}}$
 wo: $\sqrt{\frac{1}{C_3 L_3}}$
 bandwidth: $\frac{1}{C_3 R_L}$
 K-LP: 0
 K-HP: 0
 K-BP: R_L
 Qz: 0
 Wz: None

$$H(s) = \frac{L_3 R_L s}{C_3 L_3 R_L s^2 + L_3 s + R_L}$$

3.7 BP-7 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

Parameters:

Q: $R_L \sqrt{\frac{1}{L_3(C_3 + C_L)}} (C_3 + C_L)$

$$H(s) = \frac{L_3 R_L s}{C_3 L_3 R_L s^2 + C_L L_3 R_L s^2 + L_3 s + R_L}$$

wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
Qz: 0
Wz: None

3.8 BP-8 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

$$H(s) = \frac{L_3 L_L R_L s}{C_3 L_3 L_L R_L s^2 + C_L L_3 L_L R_L s^2 + L_3 L_L s + L_3 R_L + L_L R_L}$$

Parameters:

Q: $R_L \sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}} (C_3 + C_L)$
wo: $\sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}}$
bandwidth: $\frac{1}{R_L (C_3 + C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
Qz: 0
Wz: None

3.9 BP-9 $Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, R_L \right)$

$$H(s) = \frac{L_3 R_3 R_L s}{C_3 L_3 R_3 R_L s^2 + L_3 R_3 s + L_3 R_L s + R_3 R_L}$$

Parameters:

Q: $\frac{C_3 R_3 R_L \sqrt{\frac{1}{C_3 L_3}}}{R_3 + R_L}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_3 + R_L}{C_3 R_3 R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L}{R_3 + R_L}$
Qz: 0
Wz: None

3.10 BP-10 $Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + C_L L_3 R_3 s^2 + L_3 s + R_3}$$

Parameters:

Q: $R_3 \sqrt{\frac{1}{L_3 (C_3 + C_L)}} (C_3 + C_L)$
wo: $\sqrt{\frac{1}{L_3 (C_3 + C_L)}}$
bandwidth: $\frac{1}{R_3 (C_3 + C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.11 BP-11 $Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{L_3 R_3 R_L s}{C_3 L_3 R_3 R_L s^2 + C_L L_3 R_3 R_L s^2 + L_3 R_3 s + L_3 R_L s + R_3 R_L}$$

Parameters:

Q: $\frac{R_3 R_L \sqrt{\frac{1}{L_3(C_3 + C_L)}} (C_3 + C_L)}{R_3 + R_L}$
 wo: $\sqrt{\frac{1}{L_3(C_3 + C_L)}}$
 bandwidth: $\frac{R_3 + R_L}{R_3 R_L (C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_3 R_L}{R_3 + R_L}$
 Qz: 0
 Wz: None

3.12 BP-12 $Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_3 L_L R_3 s}{C_3 L_3 L_L R_3 s^2 + C_L L_3 L_L R_3 s^2 + L_3 L_L s + L_3 R_3 + L_L R_3}$$

Parameters:

Q: $R_3 \sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}} (C_3 + C_L)$
 wo: $\sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}}$
 bandwidth: $\frac{1}{R_3 (C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: R_3
 Qz: 0
 Wz: None

3.13 BP-13 $Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

$$H(s) = \frac{L_3 L_L R_3 R_L s}{C_3 L_3 L_L R_3 R_L s^2 + C_L L_3 L_L R_3 R_L s^2 + L_3 L_L R_3 s + L_3 L_L R_L s + L_3 R_3 R_L + L_L R_3 R_L}$$

Parameters:

Q: $\frac{R_3 R_L \sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}} (C_3 + C_L)}{R_3 + R_L}$
 wo: $\sqrt{\frac{L_3 + L_L}{L_3 L_L (C_3 + C_L)}}$
 bandwidth: $\frac{R_3 + R_L}{R_3 R_L (C_3 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_3 R_L}{R_3 + R_L}$
 Qz: 0
 Wz: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_3}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_3}{L_L}$
 K-LP: R_3
 K-HP: R_3
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.2 BS-2 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{R_L(C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}}(R_3 + R_L)}{R_3 R_L}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_3 R_L}{L_L(R_3 + R_L)}$
 K-LP: $\frac{R_3 R_L}{R_3 + R_L}$
 K-HP: $\frac{R_3 R_L}{R_3 + R_L}$
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.3 BS-3 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, R_L \right)$

Parameters:

Q: $\frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_L}$
 wo: $\sqrt{\frac{1}{C_3 L_3}}$
 bandwidth: $\frac{R_L}{L_3}$
 K-LP: R_L
 K-HP: R_L
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_3 L_3}}$

5.4 BS-4 $Z(s) = \left(\infty, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, R_L \right)$

Parameters:

$$H(s) = \frac{R_3 (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_3 s + 1}$$

$$H(s) = \frac{R_3 R_L (C_L L_L s^2 + 1)}{C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + R_3 + R_L}$$

$$H(s) = \frac{R_L (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_L s + 1}$$

$$H(s) = \frac{R_3 R_L (C_3 L_3 s^2 + 1)}{C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_3 R_3 R_L s + R_3 + R_L}$$

$$\begin{aligned}
\text{Q: } & \frac{L_3 \sqrt{\frac{1}{C_3 L_3}} (R_3 + R_L)}{R_3 R_L} \\
\text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\
\text{bandwidth: } & \frac{R_3 R_L}{L_3 (R_3 + R_L)} \\
\text{K-LP: } & \frac{R_3 R_L}{R_3 + R_L} \\
\text{K-HP: } & \frac{R_3 R_L}{R_3 + R_L} \\
\text{K-BP: } & 0 \\
\text{Qz: } & \text{None} \\
\text{Wz: } & \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

6 GE

$$\mathbf{6.1 \quad GE-1} \quad Z(s) = \left(\infty, \infty, R_3, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3 (C_L L_L s^2 + C_L R_L s + 1)}{C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_3 + R_L} \\
\text{wo: } & \sqrt{\frac{1}{C_L L_L}} \\
\text{bandwidth: } & \frac{R_3 + R_L}{L_L} \\
\text{K-LP: } & R_3 \\
\text{K-HP: } & R_3 \\
\text{K-BP: } & \frac{R_3 R_L}{R_3 + R_L} \\
\text{Qz: } & \frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_L} \\
\text{Wz: } & \sqrt{\frac{1}{C_L L_L}}
\end{aligned}$$

$$\mathbf{6.2 \quad GE-2} \quad Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{R_3 (C_L L_L R_L s^2 + L_L s + R_L)}{C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_L s + R_3 + R_L}$$

Parameters:

$$\begin{aligned}
\text{Q: } & C_L \sqrt{\frac{1}{C_L L_L}} (R_3 + R_L) \\
\text{wo: } & \sqrt{\frac{1}{C_L L_L}} \\
\text{bandwidth: } & \frac{1}{C_L (R_3 + R_L)} \\
\text{K-LP: } & \frac{R_3 R_L}{R_3 + R_L} \\
\text{K-HP: } & \frac{R_3 R_L}{R_3 + R_L} \\
\text{K-BP: } & R_3 \\
\text{Qz: } & C_L R_L \sqrt{\frac{1}{C_L L_L}} \\
\text{Wz: } & \sqrt{\frac{1}{C_L L_L}}
\end{aligned}$$

$$\mathbf{6.3 \quad GE-3} \quad Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, R_L \right)$$

$$H(s) = \frac{R_L (C_3 L_3 s^2 + C_3 R_3 s + 1)}{C_3 L_3 s^2 + C_3 R_3 s + C_3 R_L s + 1}$$

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3 + R_L} \\
\text{wo: } & \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

bandwidth: $\frac{R_3+R_L}{L_3}$
K-LP: R_L
K-HP: R_L
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: $\frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

6.4 GE-4 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, R_L \right)$

$$H(s) = \frac{R_L (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + L_3 s + R_3 + R_L}$$

Parameters:

Q: $C_3 \sqrt{\frac{1}{C_3 L_3}} (R_3 + R_L)$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{1}{C_3 (R_3 + R_L)}$
K-LP: $\frac{R_3 R_L}{R_3 + R_L}$
K-HP: $\frac{R_3 R_L}{R_3 + R_L}$
K-BP: R_L
Qz: $C_3 R_3 \sqrt{\frac{1}{C_3 L_3}}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_3 (C_L R_L s + 1)}{C_3 C_L R_3 R_L s^2 + C_3 R_3 s + C_L R_3 s + C_L R_L s + 1}$$

Parameters:

Q: $\frac{C_3 C_L R_3 R_L \sqrt{\frac{1}{C_3 C_L R_3 R_L}}}{C_3 R_3 + C_L R_3 + C_L R_L}$
wo: $\sqrt{\frac{1}{C_3 C_L R_3 R_L}}$
bandwidth: $\frac{C_3 R_3 + C_L R_3 + C_L R_L}{C_3 C_L R_3 R_L}$
K-LP: R_3
K-HP: 0
K-BP: $\frac{C_L R_3 R_L}{C_3 R_3 + C_L R_3 + C_L R_L}$
Qz: 0
Wz: None

8.2 INVALID-NUMER-2 $Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_L (C_3 R_3 s + 1)}{C_3 C_L R_3 R_L s^2 + C_3 R_3 s + C_3 R_L s + C_L R_L s + 1}$$

Parameters:

Q: $\frac{C_3 C_L R_3 R_L \sqrt{\frac{1}{C_3 C_L R_3 R_L}}}{C_3 R_3 + C_3 R_L + C_L R_L}$
wo: $\sqrt{\frac{1}{C_3 C_L R_3 R_L}}$

bandwidth: $\frac{C_3 R_3 + C_3 R_L + C_L R_L}{C_3 C_L R_3 R_L}$
K-LP: R_L
K-HP: 0
K-BP: $\frac{C_3 R_3 R_L}{C_3 R_3 + C_3 R_L + C_L R_L}$
Qz: 0
Wz: None

9 INVALID-WZ

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (\infty, \infty, R_3, \infty, \infty, R_L)$

$$H(s) = \frac{R_3 R_L}{R_3 + R_L}$$

10.2 INVALID-ORDER-2 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3}{C_L R_3 s + 1}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_3 R_L}{C_L R_3 R_L s + R_3 + R_L}$$

10.4 INVALID-ORDER-4 $Z(s) = \left(\infty, \infty, R_3, \infty, \infty, R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3 (C_L R_L s + 1)}{C_L R_3 s + C_L R_L s + 1}$$

10.5 INVALID-ORDER-5 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, R_L\right)$

$$H(s) = \frac{R_L}{C_3 R_L s + 1}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{1}{C_L s}\right)$

$$H(s) = \frac{1}{s (C_3 + C_L)}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_L}{C_3 R_L s + C_L R_L s + 1}$$

$$\textbf{10.8 INVALID-ORDER-8 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_L R_L s + 1}{s (C_3 C_L R_L s + C_3 + C_L)}$$

$$\textbf{10.9 INVALID-ORDER-9 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_L L_L s^2 + 1}{s (C_3 C_L L_L s^2 + C_3 + C_L)}$$

$$\textbf{10.10 INVALID-ORDER-10 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s}{C_3 L_L s^2 + C_L L_L s^2 + 1}$$

$$\textbf{10.11 INVALID-ORDER-11 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_L L_L s^2 + C_L R_L s + 1}{s (C_3 C_L L_L s^2 + C_3 C_L R_L s + C_3 + C_L)}$$

$$\textbf{10.12 INVALID-ORDER-12 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_3 C_L L_L R_L s^3 + C_3 L_L s^2 + C_3 R_L s + C_L L_L s^2 + 1}$$

$$\textbf{10.13 INVALID-ORDER-13 } Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_L L_L s^2 + 1)}{C_3 C_L L_L R_L s^3 + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

$$\textbf{10.14 INVALID-ORDER-14 } Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, R_L \right)$$

$$H(s) = \frac{R_3 R_L}{C_3 R_3 R_L s + R_3 + R_L}$$

$$\textbf{10.15 INVALID-ORDER-15 } Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3}{C_3 R_3 s + C_L R_3 s + 1}$$

$$\textbf{10.16 INVALID-ORDER-16 } Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_3 R_L}{C_3 R_3 R_L s + C_L R_3 R_L s + R_3 + R_L}$$

$$\textbf{10.17 INVALID-ORDER-17 } Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3 (C_L L_L s^2 + 1)}{C_3 C_L L_L R_3 s^3 + C_3 R_3 s + C_L L_L s^2 + C_L R_3 s + 1}$$

$$10.18 \quad \text{INVALID-ORDER-18} \quad Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3 (C_L L_L s^2 + C_L R_L s + 1)}{C_3 C_L L_L R_3 s^3 + C_3 C_L R_3 R_L s^2 + C_3 R_3 s + C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

$$10.19 \quad \text{INVALID-ORDER-19} \quad Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{R_3 (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_L R_3 R_L s^3 + C_3 L_L R_3 s^2 + C_3 R_3 R_L s + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_L s + R_3 + R_L}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_3 R_L (C_L L_L s^2 + 1)}{C_3 C_L L_L R_3 R_L s^3 + C_3 R_3 R_L s + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + R_3 + R_L}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, R_L \right)$$

$$H(s) = \frac{R_L (C_3 R_3 s + 1)}{C_3 R_3 s + C_3 R_L s + 1}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_3 R_3 s + 1}{s (C_3 C_L R_3 s + C_3 + C_L)}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 R_3 s + 1) (C_L R_L s + 1)}{s (C_3 C_L R_3 s + C_3 C_L R_L s + C_3 + C_L)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 R_3 s + 1) (C_L L_L s^2 + 1)}{s (C_3 C_L L_L s^2 + C_3 C_L R_3 s + C_3 + C_L)}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_3 R_3 s + 1)}{C_3 C_L L_L R_3 s^3 + C_3 L_L s^2 + C_3 R_3 s + C_L L_L s^2 + 1}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 R_3 s + 1) (C_L L_L s^2 + C_L R_L s + 1)}{s (C_3 C_L L_L s^2 + C_3 C_L R_3 s + C_3 C_L R_L s + C_3 + C_L)}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$$

$$H(s) = \frac{L_L R_L s (C_3 R_3 s + 1)}{C_3 C_L L_L R_3 R_L s^3 + C_3 L_L R_3 s^2 + C_3 L_L R_L s^2 + C_3 R_3 R_L s + C_L L_L R_L s^2 + L_L s + R_L}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{(C_3 R_3 s + 1) (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 L_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + 1}$$

$$10.29 \quad \text{INVALID-ORDER-29} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_3 R_3 s + 1) (C_L L_L s^2 + 1)}{C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

$$10.30 \quad \text{INVALID-ORDER-30} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_3 L_3 s^2 + 1}{s (C_3 C_L L_3 s^2 + C_3 + C_L)}$$

$$10.31 \quad \text{INVALID-ORDER-31} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_3 L_3 s^2 + 1)}{C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_3 R_L s + C_L R_L s + 1}$$

$$10.32 \quad \text{INVALID-ORDER-32} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 L_3 s^2 + 1) (C_L R_L s + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L R_L s + C_3 + C_L)}$$

$$10.33 \quad \text{INVALID-ORDER-33} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 L_3 s^2 + 1) (C_L L_L s^2 + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 + C_L)}$$

$$10.34 \quad \text{INVALID-ORDER-34} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_3 L_3 s^2 + 1)}{C_3 C_L L_3 L_L s^4 + C_3 L_3 s^2 + C_3 L_L s^2 + C_L L_L s^2 + 1}$$

$$10.35 \quad \text{INVALID-ORDER-35} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_3 L_3 s^2 + 1) (C_L L_L s^2 + C_L R_L s + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 C_L R_L s + C_3 + C_L)}$$

$$10.36 \quad \text{INVALID-ORDER-36} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$$

$$H(s) = \frac{L_L R_L s (C_3 L_3 s^2 + 1)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_3 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

$$10.37 \quad \text{INVALID-ORDER-37} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{(C_3 L_3 s^2 + 1) (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_L s + C_L L_L s^2 + 1}$$

$$10.38 \quad \text{INVALID-ORDER-38} \quad Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_3 L_3 s^2 + 1) (C_L L_L s^2 + 1)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

$$10.39 \quad \text{INVALID-ORDER-39} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_3 s}{C_3 L_3 s^2 + C_L L_3 s^2 + 1}$$

$$10.40 \quad \text{INVALID-ORDER-40} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_3 s (C_L R_L s + 1)}{C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L R_L s + 1}$$

$$10.41 \quad \text{INVALID-ORDER-41} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_3 s (C_L L_L s^2 + 1)}{C_3 C_L L_3 L_L s^4 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + 1}$$

$$10.42 \quad \text{INVALID-ORDER-42} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_3 L_L s}{C_3 L_3 L_L s^2 + C_L L_3 L_L s^2 + L_3 + L_L}$$

$$10.43 \quad \text{INVALID-ORDER-43} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_3 s (C_L L_L s^2 + C_L R_L s + 1)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_L s + 1}$$

$$10.44 \quad \text{INVALID-ORDER-44} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{L_3 s (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_L R_L s^2 + L_3 s + L_L s + R_L}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$

$$H(s) = \frac{L_3 R_L s (C_L L_L s^2 + 1)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_3 R_L s^2 + C_L L_L R_L s^2 + L_3 s + R_L}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{C_3 L_3 s^2 + C_3 R_3 s + 1}{s (C_3 C_L L_3 s^2 + C_3 C_L R_3 s + C_3 + C_L)}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_L (C_3 L_3 s^2 + C_3 R_3 s + 1)}{C_3 C_L L_3 R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_3 R_L s + C_L R_L s + 1}$$

10.48 INVALID-ORDER-48 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{(C_L R_L s + 1) (C_3 L_3 s^2 + C_3 R_3 s + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L R_3 s + C_3 C_L R_L s + C_3 + C_L)}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{(C_L L_L s^2 + 1) (C_3 L_3 s^2 + C_3 R_3 s + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 C_L R_3 s + C_3 + C_L)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L s (C_3 L_3 s^2 + C_3 R_3 s + 1)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_3 s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_3 s + C_L L_L s^2 + 1}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{(C_3 L_3 s^2 + C_3 R_3 s + 1) (C_L L_L s^2 + C_L R_L s + 1)}{s (C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 C_L R_3 s + C_3 C_L R_L s + C_3 + C_L)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

$$H(s) = \frac{L_L R_L s (C_3 L_3 s^2 + C_3 R_3 s + 1)}{C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_L R_3 R_L s^3 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_3 L_L R_3 s^2 + C_3 L_L R_L s^2 + C_3 R_3 R_L s + C_L L_L R_L s^2 + L_L s + R_L}$$

10.53 INVALID-ORDER-53 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$

$$H(s) = \frac{(C_3 L_3 s^2 + C_3 R_3 s + 1) (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + 1}$$

$$10.54 \quad \text{INVALID-ORDER-54} \quad Z(s) = \left(\infty, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$$

$$H(s) = \frac{R_L(C_LL_Ls^2+1)(C_3L_3s^2+C_3R_3s+1)}{C_3C_LL_3L_Ls^4+C_3C_LL_3R_Ls^3+C_3C_LL_LR_3s^3+C_3C_LL_R_Ls^3+C_3C_LR_3R_Ls^2+C_3L_3s^2+C_3R_3s+C_3R_Ls+C_LL_Ls^2+C_LR_Ls+1}$$

$$10.55 \quad \text{INVALID-ORDER-55} \quad Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{L_3R_3s(C_LR_Ls+1)}{C_3C_LL_3R_3R_Ls^3+C_3L_3R_3s^2+C_LL_3R_3s^2+C_LL_3R_Ls^2+C_LR_3R_Ls+L_3s+R_3}$$

$$10.56 \quad \text{INVALID-ORDER-56} \quad Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, L_Ls + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{L_3R_3s(C_LL_Ls^2+1)}{C_3C_LL_3L_LR_3s^4+C_3L_3R_3s^2+C_LL_3L_Ls^3+C_LL_3R_3s^2+C_LL_LR_3s^2+L_3s+R_3}$$

$$10.57 \quad \text{INVALID-ORDER-57} \quad Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{L_3R_3s(C_LL_Ls^2+C_LR_Ls+1)}{C_3C_LL_3L_LR_3s^4+C_3C_LL_3R_3R_Ls^3+C_3L_3R_3s^2+C_LL_3L_Ls^3+C_LL_3R_3s^2+C_LL_3R_Ls^2+C_LL_LR_3s^2+C_LR_3R_Ls+L_3s+R_3}$$

$$10.58 \quad \text{INVALID-ORDER-58} \quad Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, \frac{L_Ls}{C_LL_Ls^2+1} + R_L \right)$$

$$H(s) = \frac{L_3R_3s(C_LL_LR_Ls^2+L_Ls+R_L)}{C_3C_LL_3L_LR_3R_Ls^4+C_3L_3L_LR_3s^3+C_3L_3R_3R_Ls^2+C_LL_3L_LR_3s^3+C_LL_3L_LR_Ls^3+C_LL_LR_3R_Ls^2+L_3L_Ls^2+L_3R_3s+L_3R_Ls+L_LR_3s+R_3R_L}$$

$$10.59 \quad \text{INVALID-ORDER-59} \quad Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$$

$$H(s) = \frac{L_3R_3R_Ls(C_LL_Ls^2+1)}{C_3C_LL_3L_LR_3R_Ls^4+C_3L_3R_3R_Ls^2+C_LL_3L_LR_3s^3+C_LL_3L_LR_Ls^3+C_LL_3R_3R_Ls^2+C_LL_LR_3R_Ls^2+L_3R_3s+L_3R_Ls+R_3R_L}$$

$$10.60 \quad \text{INVALID-ORDER-60} \quad Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3C_LL_3R_3s^3+C_3L_3s^2+C_LL_3s^2+C_LR_3s+1}$$

$$10.61 \quad \text{INVALID-ORDER-61} \quad Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, \frac{R_L}{C_LR_Ls+1} \right)$$

$$H(s) = \frac{R_L(C_3L_3R_3s^2+L_3s+R_3)}{C_3C_LL_3R_3R_Ls^3+C_3L_3R_3s^2+C_3L_3R_Ls^2+C_LR_3R_Ls^2+C_LR_3R_Ls+L_3s+R_3+R_L}$$

$$10.62 \quad \text{INVALID-ORDER-62} \quad Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{(C_LR_Ls+1)(C_3L_3R_3s^2+L_3s+R_3)}{C_3C_LL_3R_3s^3+C_3C_LL_3R_Ls^3+C_3L_3s^2+C_LL_3s^2+C_LR_3s+C_LR_Ls+1}$$

$$10.63 \quad \text{INVALID-ORDER-63} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_L L_L s^2 + 1) (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_3 s + 1}$$

$$10.64 \quad \text{INVALID-ORDER-64} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_L L_3 L_L s^3 + C_L L_L R_3 s^2 + L_3 s + L_L s + R_3}$$

$$10.65 \quad \text{INVALID-ORDER-65} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_L L_L s^2 + C_L R_L s + 1) (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

$$10.66 \quad \text{INVALID-ORDER-66} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$$

$$H(s) = \frac{L_L R_L s (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 C_L L_3 L_L R_3 R_L s^4 + C_3 L_3 L_L R_3 s^3 + C_3 L_3 L_L R_L s^3 + C_3 L_3 R_3 R_L s^2 + C_L L_3 L_L R_L s^3 + C_L L_L R_3 R_L s^2 + L_3 L_L s^2 + L_3 R_L s + L_L R_3 s + L_L R_L s + R_3 R_L}$$

$$10.67 \quad \text{INVALID-ORDER-67} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{(C_3 L_3 R_3 s^2 + L_3 s + R_3) (C_L L_L R_L s^2 + L_L s + R_L)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_3 s + L_L s + R_3 + R_L}$$

$$10.68 \quad \text{INVALID-ORDER-68} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_L L_L s^2 + 1) (C_3 L_3 R_3 s^2 + L_3 s + R_3)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_3 R_L s^2 + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + L_3 s + R_3 + R_L}$$

$$10.69 \quad \text{INVALID-ORDER-69} \quad Z(s) = \left(\infty, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 C_L L_3 R_3 s^3 + C_3 L_3 s^2 + C_3 R_3 s + C_L R_3 s + 1}$$

$$10.70 \quad \text{INVALID-ORDER-70} \quad Z(s) = \left(\infty, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_3 R_L (C_3 L_3 s^2 + 1)}{C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_3 R_3 R_L s + C_L R_3 R_L s + R_3 + R_L}$$

$$10.71 \quad \text{INVALID-ORDER-71} \quad Z(s) = \left(\infty, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_3 (C_3 L_3 s^2 + 1) (C_L R_L s + 1)}{C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_L R_3 s + C_L R_L s + 1}$$

$$10.72 \quad \text{INVALID-ORDER-72} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad L_Ls + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{R_3(C_3L_3s^2+1)(C_LL_Ls^2+1)}{C_3C_LL_3L_Ls^4 + C_3C_LL_3R_3s^3 + C_3C_LL_LR_3s^3 + C_3L_3s^2 + C_3R_3s + C_LL_Ls^2 + C_LR_3s + 1}$$

$$10.73 \quad \text{INVALID-ORDER-73} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad \frac{L_Ls}{C_LL_Ls^2+1} \right)$$

$$H(s) = \frac{L_LR_3s(C_3L_3s^2+1)}{C_3C_LL_3L_LR_3s^4 + C_3L_3L_Ls^3 + C_3L_3R_3s^2 + C_3L_LR_3s^2 + C_LL_LR_3s^2 + L_Ls + R_3}$$

$$10.74 \quad \text{INVALID-ORDER-74} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad L_Ls + R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{R_3(C_3L_3s^2+1)(C_LL_Ls^2 + C_LR_Ls + 1)}{C_3C_LL_3L_Ls^4 + C_3C_LL_3R_3s^3 + C_3C_LL_3R_Ls^3 + C_3C_LL_LR_3s^3 + C_3C_LR_3R_Ls^2 + C_3L_3s^2 + C_3R_3s + C_LL_Ls^2 + C_LR_3s + C_LR_Ls + 1}$$

$$10.75 \quad \text{INVALID-ORDER-75} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L} \right)$$

$$H(s) = \frac{L_LR_3R_Ls(C_3L_3s^2+1)}{C_3C_LL_3L_LR_3R_Ls^4 + C_3L_3L_LR_3s^3 + C_3L_3L_LR_Ls^3 + C_3L_3R_3R_Ls^2 + C_3L_LR_3R_Ls^2 + C_LL_LR_3R_Ls^2 + L_LR_3s + L_LR_Ls + R_3R_L}$$

$$10.76 \quad \text{INVALID-ORDER-76} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad \frac{L_Ls}{C_LL_Ls^2+1} + R_L \right)$$

$$H(s) = \frac{R_3(C_3L_3s^2+1)(C_LL_LR_Ls^2 + L_Ls + R_L)}{C_3C_LL_3L_LR_3s^4 + C_3C_LL_3L_LR_Ls^4 + C_3C_LL_LR_3R_Ls^3 + C_3L_3L_Ls^3 + C_3L_3R_3s^2 + C_3L_3R_Ls^2 + C_3L_LR_3s^2 + C_3R_3R_Ls + C_LL_LR_3s^2 + C_LL_LR_Ls^2 + L_Ls + R_3 + R_L}$$

$$10.77 \quad \text{INVALID-ORDER-77} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \infty, \quad \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$$

$$H(s) = \frac{R_3R_L(C_3L_3s^2+1)(C_LL_Ls^2+1)}{C_3C_LL_3L_LR_3s^4 + C_3C_LL_3L_LR_Ls^4 + C_3C_LL_3R_3R_Ls^3 + C_3C_LL_LR_3R_Ls^3 + C_3L_3R_3s^2 + C_3L_3R_Ls^2 + C_3R_3R_Ls + C_LL_LR_3s^2 + C_LL_LR_Ls^2 + C_LR_3R_Ls + R_3 + R_L}$$

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