

Filter Summary Report: TIA,some,parasitic,Z4,ZL

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$$H(z) = \frac{Z_4 Z_L (g_m r_o + 1)}{Z_4 g_m r_o + Z_4 + 2Z_L g_m r_o + 2Z_L}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L R_4 s}{C_L L_L R_4 s^2 + 2L_L s + R_4}$$

Parameters:

Q: $\frac{C_L R_4 \sqrt{\frac{1}{C_L L_L}}}{2}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{2}{C_L R_4}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_4}{2}$
 QZ: 0
 Wz: None

3.2 BP-2 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

$$H(s) = \frac{L_L R_4 R_L s}{C_L L_L R_4 R_L s^2 + L_L R_4 s + 2L_L R_L s + R_4 R_L}$$

Parameters:

Q: $\frac{C_L R_4 R_L \sqrt{\frac{1}{C_L L_L}}}{R_4 + 2R_L}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_4 + 2R_L}{C_L R_4 R_L}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_4 R_L}{R_4 + 2R_L}$
 QZ: 0
 Wz: None

3.3 BP-3 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

$$H(s) = \frac{L_L R_L s}{2C_4 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

Parameters:

Q: $R_L \sqrt{\frac{1}{L_L (2C_4 + C_L)}} (2C_4 + C_L)$

wo: $\sqrt{\frac{1}{L_L(2C_4+C_L)}}$
bandwidth: $\frac{1}{R_L(2C_4+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
QZ: 0
Wz: None

3.4 BP-4 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L R_4 s}{2C_4 L_L R_4 s^2 + C_L L_L R_4 s^2 + 2L_L s + R_4}$$

Parameters:

Q: $\frac{R_4 \sqrt{\frac{1}{L_L(2C_4+C_L)}}(2C_4+C_L)}{2}$
wo: $\sqrt{\frac{1}{L_L(2C_4+C_L)}}$
bandwidth: $\frac{2}{R_4(2C_4+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4}{2}$
QZ: 0
Wz: None

3.5 BP-5 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

$$H(s) = \frac{L_L R_4 R_L s}{2C_4 L_L R_4 R_L s^2 + C_L L_L R_4 R_L s^2 + L_L R_4 s + 2L_L R_L s + R_4 R_L}$$

Parameters:

Q: $\frac{R_4 R_L \sqrt{\frac{1}{L_L(2C_4+C_L)}}(2C_4+C_L)}{R_4 + 2R_L}$
wo: $\sqrt{\frac{1}{L_L(2C_4+C_L)}}$
bandwidth: $\frac{R_4 + 2R_L}{R_4 R_L(2C_4+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4 R_L}{R_4 + 2R_L}$
QZ: 0
Wz: None

3.6 BP-6 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, R_L \right)$

$$H(s) = \frac{L_4 R_L s}{2C_4 L_4 R_L s^2 + L_4 s + 2R_L}$$

Parameters:

Q: $2C_4 R_L \sqrt{\frac{1}{C_4 L_4}}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{1}{2C_4 R_L}$
K-LP: 0

K-HP: 0
K-BP: R_L
QZ: 0
Wz: None

$$\mathbf{3.7 \quad BP-7} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

Parameters:

Q: $\sqrt{2} R_L \sqrt{\frac{1}{L_4 (2C_4 + C_L)}} (2C_4 + C_L)$
wo: $\sqrt{2} \sqrt{\frac{1}{L_4 (2C_4 + C_L)}}$
bandwidth: $\frac{1}{R_L (2C_4 + C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
QZ: 0
Wz: None

$$H(s) = \frac{L_4 R_L s}{2C_4 L_4 R_L s^2 + C_L L_4 R_L s^2 + L_4 s + 2R_L}$$

$$\mathbf{3.8 \quad BP-8} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$$

Parameters:

Q: $R_L \sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}} (2C_4 + C_L)$
wo: $\sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}}$
bandwidth: $\frac{1}{R_L (2C_4 + C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
QZ: 0
Wz: None

$$H(s) = \frac{L_4 L_L R_L s}{2C_4 L_4 L_L R_L s^2 + C_L L_4 L_L R_L s^2 + L_4 L_L s + L_4 R_L + 2L_L R_L}$$

$$\mathbf{3.9 \quad BP-9} \quad Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, R_L \right)$$

Parameters:

Q: $\frac{2C_4 R_4 R_L \sqrt{\frac{1}{C_4 L_4}}}{R_4 + 2R_L}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{R_4 + 2R_L}{2C_4 R_4 R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4 R_L}{R_4 + 2R_L}$
QZ: 0

$$H(s) = \frac{L_4 R_4 R_L s}{2C_4 L_4 R_4 R_L s^2 + L_4 R_4 s + 2L_4 R_L s + 2R_4 R_L}$$

Wz: None

$$3.10 \quad \text{BP-10} \quad Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, \frac{1}{C_L s} \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{\sqrt{2} R_4 \sqrt{\frac{1}{L_4 (2C_4 + C_L)}} (2C_4 + C_L)}{2} \\ \text{wo: } & \sqrt{2} \sqrt{\frac{1}{L_4 (2C_4 + C_L)}} \\ \text{bandwidth: } & \frac{2}{R_4 (2C_4 + C_L)} \\ \text{K-LP: } & 0 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & \frac{R_4}{2} \\ \text{QZ: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{L_4 R_4 s}{2C_4 L_4 R_4 s^2 + C_L L_4 R_4 s^2 + 2L_4 s + 2R_4}$$

$$3.11 \quad \text{BP-11} \quad Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{\sqrt{2} R_4 R_L \sqrt{\frac{1}{L_4 (2C_4 + C_L)}} (2C_4 + C_L)}{R_4 + 2R_L} \\ \text{wo: } & \sqrt{2} \sqrt{\frac{1}{L_4 (2C_4 + C_L)}} \\ \text{bandwidth: } & \frac{R_4 + 2R_L}{R_4 R_L (2C_4 + C_L)} \\ \text{K-LP: } & 0 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & \frac{R_4 R_L}{R_4 + 2R_L} \\ \text{QZ: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{L_4 R_4 R_L s}{2C_4 L_4 R_4 R_L s^2 + C_L L_4 R_4 R_L s^2 + L_4 R_4 s + 2L_4 R_L s + 2R_4 R_L}$$

$$3.12 \quad \text{BP-12} \quad Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{R_4 \sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}} (2C_4 + C_L)}{2} \\ \text{wo: } & \sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}} \\ \text{bandwidth: } & \frac{2}{R_4 (2C_4 + C_L)} \\ \text{K-LP: } & 0 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & \frac{R_4}{2} \\ \text{QZ: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{L_4 L_L R_4 s}{2C_4 L_4 L_L R_4 s^2 + C_L L_4 L_L R_4 s^2 + 2L_4 L_L s + L_4 R_4 + 2L_L R_4}$$

3.13 BP-13 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

$$H(s) = \frac{L_4 L_L R_4 R_L s}{2C_4 L_4 L_L R_4 R_L s^2 + C_L L_4 L_L R_4 R_L s^2 + L_4 L_L R_4 s + 2L_4 L_L R_L s + L_4 R_4 R_L + 2L_L R_4 R_L}$$

Parameters:

Q: $\frac{R_4 R_L \sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}} (2C_4 + C_L)}{R_4 + 2R_L}$
 wo: $\sqrt{\frac{L_4 + 2L_L}{L_4 L_L (2C_4 + C_L)}}$
 bandwidth: $\frac{R_4 + 2R_L}{R_4 R_L (2C_4 + C_L)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_4 R_L}{R_4 + 2R_L}$
 QZ: 0
 WZ: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_L L_L s^2 + 1)}{2C_L L_L s^2 + C_L R_4 s + 2}$$

Parameters:

Q: $\frac{2L_L \sqrt{\frac{1}{C_L L_L}}}{R_4}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_4}{2L_L}$
 K-LP: $\frac{R_4}{2}$
 K-HP: $\frac{R_4}{2}$
 K-BP: 0
 QZ: None
 WZ: $\sqrt{\frac{1}{C_L L_L}}$

5.2 BS-2 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{R_4 R_L (C_L L_L s^2 + 1)}{C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + C_L R_4 R_L s + R_4 + 2R_L}$$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}} (R_4 + 2R_L)}{R_4 R_L}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{R_4 R_L}{L_L (R_4 + 2R_L)}$
 K-LP: $\frac{R_4 R_L}{R_4 + 2R_L}$

K-HP: $\frac{R_4 R_L}{R_4 + 2R_L}$
K-BP: 0
QZ: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.3 BS-3 $Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, R_L \right)$

$$H(s) = \frac{R_L (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + 2C_4 R_L s + 1}$$

Parameters:

Q: $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{2R_L}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2R_L}{L_4}$
K-LP: R_L
K-HP: R_L
K-BP: 0
QZ: None
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

5.4 BS-4 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, R_L \right)$

$$H(s) = \frac{R_4 R_L (C_4 L_4 s^2 + 1)}{C_4 L_4 R_4 s^2 + 2C_4 L_4 R_L s^2 + 2C_4 R_4 R_L s + R_4 + 2R_L}$$

Parameters:

Q: $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}} (R_4 + 2R_L)}{2R_4 R_L}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2R_4 R_L}{L_4 (R_4 + 2R_L)}$
K-LP: $\frac{R_4 R_L}{R_4 + 2R_L}$
K-HP: $\frac{R_4 R_L}{R_4 + 2R_L}$
K-BP: 0
QZ: None
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

6 GE

6.1 GE-1 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_L L_L s^2 + C_L R_L s + 1)}{2C_L L_L s^2 + C_L R_4 s + 2C_L R_L s + 2}$$

Parameters:

Q: $\frac{2L_L \sqrt{\frac{1}{C_L L_L}}}{R_4 + 2R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$

$$\begin{aligned}
&\text{bandwidth: } \frac{R_4+2R_L}{2L_L} \\
&\text{K-LP: } \frac{R_4}{2} \\
&\text{K-HP: } \frac{R_4}{2} \\
&\text{K-BP: } \frac{R_4 R_L}{R_4+2R_L} \\
&\text{QZ: } \frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_L} \\
&\text{WZ: } \sqrt{\frac{1}{C_L L_L}}
\end{aligned}$$

$$\mathbf{6.2 \quad GE-2} \quad Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

Parameters:

$$\begin{aligned}
&\text{Q: } \frac{C_L \sqrt{\frac{1}{C_L L_L}} (R_4 + 2R_L)}{2} \\
&\text{wo: } \sqrt{\frac{1}{C_L L_L}} \\
&\text{bandwidth: } \frac{2}{C_L (R_4 + 2R_L)} \\
&\text{K-LP: } \frac{R_4 R_L}{R_4 + 2R_L} \\
&\text{K-HP: } \frac{R_4 R_L}{R_4 + 2R_L} \\
&\text{K-BP: } \frac{R_4}{2} \\
&\text{QZ: } C_L R_L \sqrt{\frac{1}{C_L L_L}} \\
&\text{WZ: } \sqrt{\frac{1}{C_L L_L}}
\end{aligned}$$

$$\mathbf{6.3 \quad GE-3} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, R_L \right)$$

Parameters:

$$\begin{aligned}
&\text{Q: } \frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4 + 2R_L} \\
&\text{wo: } \sqrt{\frac{1}{C_4 L_4}} \\
&\text{bandwidth: } \frac{R_4 + 2R_L}{L_4} \\
&\text{K-LP: } R_L \\
&\text{K-HP: } R_L \\
&\text{K-BP: } \frac{R_4 R_L}{R_4 + 2R_L} \\
&\text{QZ: } \frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4} \\
&\text{WZ: } \sqrt{\frac{1}{C_4 L_4}}
\end{aligned}$$

$$\mathbf{6.4 \quad GE-4} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, R_L \right)$$

Parameters:

$$\text{Q: } C_4 \sqrt{\frac{1}{C_4 L_4}} (R_4 + 2R_L)$$

$$H(s) = \frac{R_4 (C_L L_L R_L s^2 + L_L s + R_L)}{C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + 2L_L s + R_4 + 2R_L}$$

$$H(s) = \frac{R_L (C_4 L_4 s^2 + C_4 R_4 s + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 2C_4 R_L s + 1}$$

$$H(s) = \frac{R_L (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 L_4 R_4 s^2 + 2C_4 L_4 R_L s^2 + L_4 s + R_4 + 2R_L}$$

$$\begin{aligned}
\text{wo: } & \sqrt{\frac{1}{C_4 L_4}} \\
\text{bandwidth: } & \frac{1}{C_4(R_4+2R_L)} \\
\text{K-LP: } & \frac{R_4 R_L}{R_4+2R_L} \\
\text{K-HP: } & \frac{R_4 R_L}{R_4+2R_L} \\
\text{K-BP: } & R_L \\
\text{QZ: } & C_4 R_4 \sqrt{\frac{1}{C_4 L_4}} \\
\text{WZ: } & \sqrt{\frac{1}{C_4 L_4}}
\end{aligned}$$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_L R_L s + 1)}{2C_4 C_L R_4 R_L s^2 + 2C_4 R_4 s + C_L R_4 s + 2C_L R_L s + 2}$$

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{2C_4 C_L R_4 R_L \sqrt{\frac{1}{C_4 C_L R_4 R_L}}}{2C_4 R_4 + C_L R_4 + 2C_L R_L} \\
\text{wo: } & \sqrt{\frac{1}{C_4 C_L R_4 R_L}} \\
\text{bandwidth: } & \frac{2C_4 R_4 + C_L R_4 + 2C_L R_L}{2C_4 C_L R_4 R_L} \\
\text{K-LP: } & \frac{R_4}{2} \\
\text{K-HP: } & 0 \\
\text{K-BP: } & \frac{C_L R_4 R_L}{2C_4 R_4 + C_L R_4 + 2C_L R_L} \\
\text{QZ: } & 0 \\
\text{WZ: } & \text{None}
\end{aligned}$$

8.2 INVALID-NUMER-2 $Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_L (C_4 R_4 s + 1)}{C_4 C_L R_4 R_L s^2 + C_4 R_4 s + 2C_4 R_L s + C_L R_L s + 1}$$

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{C_4 C_L R_4 R_L \sqrt{\frac{1}{C_4 C_L R_4 R_L}}}{C_4 R_4 + 2C_4 R_L + C_L R_L} \\
\text{wo: } & \sqrt{\frac{1}{C_4 C_L R_4 R_L}} \\
\text{bandwidth: } & \frac{C_4 R_4 + 2C_4 R_L + C_L R_L}{C_4 C_L R_4 R_L} \\
\text{K-LP: } & R_L \\
\text{K-HP: } & 0 \\
\text{K-BP: } & \frac{C_4 R_4 R_L}{C_4 R_4 + 2C_4 R_L + C_L R_L} \\
\text{QZ: } & 0 \\
\text{WZ: } & \text{None}
\end{aligned}$$

9 INVALID-WZ

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (\infty, \infty, \infty, R_4, \infty, R_L)$

$$H(s) = \frac{R_4 R_L}{R_4 + 2R_L}$$

10.2 INVALID-ORDER-2 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_4}{C_L R_4 s + 2}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_4 R_L}{C_L R_4 R_L s + R_4 + 2R_L}$$

10.4 INVALID-ORDER-4 $Z(s) = \left(\infty, \infty, \infty, R_4, \infty, R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_4 (C_L R_L s + 1)}{C_L R_4 s + 2C_L R_L s + 2}$$

10.5 INVALID-ORDER-5 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, R_L\right)$

$$H(s) = \frac{R_L}{2C_4 R_L s + 1}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{1}{C_L s}\right)$

$$H(s) = \frac{1}{s(2C_4 + C_L)}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_L}{2C_4 R_L s + C_L R_L s + 1}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L R_L s + 1}{s(2C_4 C_L R_L s + 2C_4 + C_L)}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{C_L L_L s^2 + 1}{s(2C_4 C_L L_L s^2 + 2C_4 + C_L)}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L s}{2C_4 L_L s^2 + C_L L_L s^2 + 1}$$

10.11 INVALID-ORDER-11 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{C_L L_L s^2 + C_L R_L s + 1}{s(2C_4 C_L L_L s^2 + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$

$$H(s) = \frac{C_L L_L R_L s^2 + L_L s + R_L}{2C_4 C_L L_L R_L s^3 + 2C_4 L_L s^2 + 2C_4 R_L s + C_L L_L s^2 + 1}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s}, \infty, \frac{R_L \left(L_L s + \frac{1}{C_L s} \right)}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{R_L (C_L L_L s^2 + 1)}{2C_4 C_L L_L R_L s^3 + 2C_4 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, R_L \right)$

$$H(s) = \frac{R_4 R_L}{2C_4 R_4 R_L s + R_4 + 2R_L}$$

10.15 INVALID-ORDER-15 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4}{2C_4 R_4 s + C_L R_4 s + 2}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_4 R_L}{2C_4 R_4 R_L s + C_L R_4 R_L s + R_4 + 2R_L}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_L L_L s^2 + 1)}{2C_4 C_L L_L R_4 s^3 + 2C_4 R_4 s + 2C_L L_L s^2 + C_L R_4 s + 2}$$

$$10.18 \quad \text{INVALID-ORDER-18} \quad Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{R_4 (C_L L_L s^2 + C_L R_L s + 1)}{2C_4 C_L L_L R_4 s^3 + 2C_4 C_L R_4 R_L s^2 + 2C_4 R_4 s + 2C_L L_L s^2 + C_L R_4 s + 2C_L R_L s + 2}$$

$$10.19 \quad \text{INVALID-ORDER-19} \quad Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{R_4 (C_L L_L R_L s^2 + L_L s + R_L)}{2C_4 C_L L_L R_4 R_L s^3 + 2C_4 L_L R_4 s^2 + 2C_4 R_4 R_L s + C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + 2L_L s + R_4 + 2R_L}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left(\infty, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$$

$$H(s) = \frac{R_4 R_L (C_L L_L s^2 + 1)}{2C_4 C_L L_L R_4 R_L s^3 + 2C_4 R_4 R_L s + C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + C_L R_4 R_L s + R_4 + 2R_L}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, R_L \right)$$

$$H(s) = \frac{R_L (C_4 R_4 s + 1)}{C_4 R_4 s + 2C_4 R_L s + 1}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_4 R_4 s + 1}{s (C_4 C_L R_4 s + 2C_4 + C_L)}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 R_4 s + 1) (C_L R_L s + 1)}{s (C_4 C_L R_4 s + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 R_4 s + 1) (C_L L_L s^2 + 1)}{s (2C_4 C_L L_L s^2 + C_4 C_L R_4 s + 2C_4 + C_L)}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_4 R_4 s + 1)}{C_4 C_L L_L R_4 s^3 + 2C_4 L_L s^2 + C_4 R_4 s + C_L L_L s^2 + 1}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 R_4 s + 1) (C_L L_L s^2 + C_L R_L s + 1)}{s (2C_4 C_L L_L s^2 + C_4 C_L R_4 s + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$$

$$H(s) = \frac{L_L R_L s (C_4 R_4 s + 1)}{C_4 C_L L_L R_4 R_L s^3 + C_4 L_L R_4 s^2 + 2C_4 L_L R_L s^2 + C_4 R_4 R_L s + C_L L_L R_L s^2 + L_L s + R_L}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{(C_4 R_4 s + 1) (C_L L_L R_L s^2 + L_L s + R_L)}{C_4 C_L L_L R_4 s^3 + 2C_4 C_L L_L R_L s^3 + 2C_4 L_L s^2 + C_4 R_4 s + 2C_4 R_L s + C_L L_L s^2 + 1}$$

$$10.29 \quad \text{INVALID-ORDER-29} \quad Z(s) = \left(\infty, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$$

$$H(s) = \frac{R_L (C_4 R_4 s + 1) (C_L L_L s^2 + 1)}{C_4 C_L L_L R_4 s^3 + 2C_4 C_L L_L R_L s^3 + C_4 C_L R_4 R_L s^2 + C_4 R_4 s + 2C_4 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

$$10.30 \quad \text{INVALID-ORDER-30} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_4 L_4 s^2 + 1}{s (C_4 C_L L_4 s^2 + 2C_4 + C_L)}$$

$$10.31 \quad \text{INVALID-ORDER-31} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 R_L s^3 + C_4 L_4 s^2 + 2C_4 R_L s + C_L R_L s + 1}$$

$$10.32 \quad \text{INVALID-ORDER-32} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 L_4 s^2 + 1) (C_L R_L s + 1)}{s (C_4 C_L L_4 s^2 + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

$$10.33 \quad \text{INVALID-ORDER-33} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 L_4 s^2 + 1) (C_L L_L s^2 + 1)}{s (C_4 C_L L_4 s^2 + 2C_4 C_L L_L s^2 + 2C_4 + C_L)}$$

$$10.34 \quad \text{INVALID-ORDER-34} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 L_L s^4 + C_4 L_4 s^2 + 2C_4 L_L s^2 + C_L L_L s^2 + 1}$$

$$10.35 \quad \text{INVALID-ORDER-35} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_4 L_4 s^2 + 1)(C_L L_L s^2 + C_L R_L s + 1)}{s(C_4 C_L L_4 s^2 + 2C_4 C_L L_L s^2 + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

$$10.36 \quad \text{INVALID-ORDER-36} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$$

$$H(s) = \frac{L_L R_L s (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 L_L R_L s^4 + C_4 L_4 L_L s^3 + C_4 L_4 R_L s^2 + 2C_4 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

$$10.37 \quad \text{INVALID-ORDER-37} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$$

$$H(s) = \frac{(C_4 L_4 s^2 + 1)(C_L L_L R_L s^2 + L_L s + R_L)}{C_4 C_L L_4 L_L s^4 + 2C_4 C_L L_L R_L s^3 + C_4 L_4 s^2 + 2C_4 L_L s^2 + 2C_4 R_L s + C_L L_L s^2 + 1}$$

$$10.38 \quad \text{INVALID-ORDER-38} \quad Z(s) = \left(\infty, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$$

$$H(s) = \frac{R_L (C_4 L_4 s^2 + 1)(C_L L_L s^2 + 1)}{C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_L s^3 + 2C_4 C_L L_L R_L s^3 + C_4 L_4 s^2 + 2C_4 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

$$10.39 \quad \text{INVALID-ORDER-39} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_4 s}{2C_4 L_4 s^2 + C_L L_4 s^2 + 2}$$

$$10.40 \quad \text{INVALID-ORDER-40} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_4 s (C_L R_L s + 1)}{2C_4 C_L L_4 R_L s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + 2C_L R_L s + 2}$$

$$10.41 \quad \text{INVALID-ORDER-41} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{L_4 s (C_L L_L s^2 + 1)}{2C_4 C_L L_4 L_L s^4 + 2C_4 L_4 s^2 + C_L L_4 s^2 + 2C_L L_L s^2 + 2}$$

$$10.42 \quad \text{INVALID-ORDER-42} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_4 L_L s}{2C_4 L_4 L_L s^2 + C_L L_4 L_L s^2 + L_4 + 2L_L}$$

10.43 INVALID-ORDER-43 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{L_4 s (C_L L_L s^2 + C_L R_L s + 1)}{2C_4 C_L L_4 L_L s^4 + 2C_4 C_L L_4 R_L s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + 2C_L L_L s^2 + 2C_L R_L s + 2}$$

10.44 INVALID-ORDER-44 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$

$$H(s) = \frac{L_4 s (C_L L_L R_L s^2 + L_L s + R_L)}{2C_4 C_L L_4 L_L R_L s^4 + 2C_4 L_4 L_L s^3 + 2C_4 L_4 R_L s^2 + C_L L_4 L_L s^3 + 2C_L L_L R_L s^2 + L_4 s + 2L_L s + 2R_L}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{L_4 R_L s (C_L L_L s^2 + 1)}{2C_4 C_L L_4 L_L R_L s^4 + 2C_4 L_4 R_L s^2 + C_L L_4 L_L s^3 + C_L L_4 R_L s^2 + 2C_L L_L R_L s^2 + L_4 s + 2R_L}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{C_4 L_4 s^2 + C_4 R_4 s + 1}{s (C_4 C_L L_4 s^2 + C_4 C_L R_4 s + 2C_4 + C_L)}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_L (C_4 L_4 s^2 + C_4 R_4 s + 1)}{C_4 C_L L_4 R_L s^3 + C_4 C_L R_4 R_L s^2 + C_4 L_4 s^2 + C_4 R_4 s + 2C_4 R_L s + C_L R_L s + 1}$$

10.48 INVALID-ORDER-48 $Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{(C_L R_L s + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{s (C_4 C_L L_4 s^2 + C_4 C_L R_4 s + 2C_4 C_L R_L s + 2C_4 + C_L)}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{(C_L L_L s^2 + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{s (C_4 C_L L_4 s^2 + 2C_4 C_L L_L s^2 + C_4 C_L R_4 s + 2C_4 + C_L)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L s (C_4 L_4 s^2 + C_4 R_4 s + 1)}{C_4 C_L L_4 L_L s^4 + C_4 C_L L_L R_4 s^3 + C_4 L_4 s^2 + 2C_4 L_L s^2 + C_4 R_4 s + C_L L_L s^2 + 1}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty, \infty, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$

$$H(s) = \frac{(C_4L_4s^2 + C_4R_4s + 1)(C_LL_Ls^2 + C_LR_Ls + 1)}{s(C_4C_LL_4s^2 + 2C_4C_LL_Ls^2 + C_4C_LR_4s + 2C_4C_LR_Ls + 2C_4 + C_L)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(\infty, \infty, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \frac{1}{C_Ls + \frac{1}{R_L} + \frac{1}{L_Ls}} \right)$

$$H(s) = \frac{L_LR_Ls(C_4L_4s^2 + C_4R_4s + 1)}{C_4C_LL_4L_LR_Ls^4 + C_4C_LL_LR_4R_Ls^3 + C_4L_4L_Ls^3 + C_4L_4R_Ls^2 + C_4L_LR_4s^2 + 2C_4L_LR_Ls^2 + C_4R_4R_Ls + C_LL_LR_Ls^2 + L_Ls + R_L}$$

10.53 INVALID-ORDER-53 $Z(s) = \left(\infty, \infty, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \frac{L_Ls}{C_LL_Ls^2 + 1} + R_L \right)$

$$H(s) = \frac{(C_4L_4s^2 + C_4R_4s + 1)(C_LL_LR_Ls^2 + L_Ls + R_L)}{C_4C_LL_4L_Ls^4 + C_4C_LL_LR_4s^3 + 2C_4C_LL_LR_Ls^3 + C_4L_4s^2 + 2C_4L_Ls^2 + C_4R_4s + 2C_4R_Ls + C_LL_Ls^2 + 1}$$

10.54 INVALID-ORDER-54 $Z(s) = \left(\infty, \infty, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \frac{R_L(L_Ls + \frac{1}{C_Ls})}{L_Ls + R_L + \frac{1}{C_Ls}} \right)$

$$H(s) = \frac{R_L(C_LL_Ls^2 + 1)(C_4L_4s^2 + C_4R_4s + 1)}{C_4C_LL_4L_Ls^4 + C_4C_LL_4R_Ls^3 + C_4C_LL_R_4s^3 + 2C_4C_LL_LR_Ls^3 + C_4C_LR_4R_Ls^2 + C_4L_4s^2 + C_4R_4s + 2C_4R_Ls + C_LL_Ls^2 + C_LR_Ls + 1}$$

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4s + \frac{1}{R_4} + \frac{1}{L_4s}}, \infty, R_L + \frac{1}{C_Ls} \right)$

$$H(s) = \frac{L_4R_4s(C_LR_Ls + 1)}{2C_4C_LL_4R_4R_Ls^3 + 2C_4L_4R_4s^2 + C_LL_4R_4s^2 + 2C_LL_4R_Ls^2 + 2C_LR_4R_Ls + 2L_4s + 2R_4}$$

10.56 INVALID-ORDER-56 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4s + \frac{1}{R_4} + \frac{1}{L_4s}}, \infty, L_Ls + \frac{1}{C_Ls} \right)$

$$H(s) = \frac{L_4R_4s(C_LL_Ls^2 + 1)}{2C_4C_LL_4L_LR_4s^4 + 2C_4L_4R_4s^2 + 2C_LL_4L_Ls^3 + C_LL_4R_4s^2 + 2C_LL_4R_4s^2 + 2L_4s + 2R_4}$$

10.57 INVALID-ORDER-57 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4s + \frac{1}{R_4} + \frac{1}{L_4s}}, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$

$$H(s) = \frac{L_4R_4s(C_LL_Ls^2 + C_LR_Ls + 1)}{2C_4C_LL_4L_LR_4s^4 + 2C_4C_LL_4R_4R_Ls^3 + 2C_4L_4R_4s^2 + 2C_LL_4L_Ls^3 + C_LL_4R_4s^2 + 2C_LL_4R_Ls^2 + 2C_LL_4R_4s^2 + 2C_LR_4R_Ls + 2L_4s + 2R_4}$$

10.58 INVALID-ORDER-58 $Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4s + \frac{1}{R_4} + \frac{1}{L_4s}}, \infty, \frac{L_Ls}{C_LL_Ls^2 + 1} + R_L \right)$

$$H(s) = \frac{L_4R_4s(C_LL_LR_Ls^2 + L_Ls + R_L)}{2C_4C_LL_4L_LR_4R_Ls^4 + 2C_4L_4L_LR_4s^3 + 2C_4L_4R_4R_Ls^2 + C_LL_4L_LR_4s^3 + 2C_LL_4L_LR_Ls^3 + 2C_LL_4R_4R_Ls^2 + 2L_4L_Ls^2 + L_4R_4s + 2L_4R_Ls + 2L_LR_4s + 2R_4R_L}$$

$$10.59 \quad \text{INVALID-ORDER-59} \quad Z(s) = \left(\infty, \infty, \infty, \frac{1}{C_4 s + \frac{1}{R_4} + \frac{1}{L_4 s}}, \infty, \frac{R_L \left(L_L s + \frac{1}{C_L s} \right)}{L_L s + R_L + \frac{1}{C_L s}} \right)$$

$$H(s) = \frac{L_4 R_4 R_L s (C_L L_L s^2 + 1)}{2C_4 C_L L_4 L_L R_4 R_L s^4 + 2C_4 L_4 R_4 R_L s^2 + C_L L_4 L_L R_4 s^3 + 2C_L L_4 L_L R_L s^3 + C_L L_4 R_4 R_L s^2 + 2C_L L_L R_4 R_L s^2 + L_4 R_4 s + 2L_4 R_L s + 2R_4 R_L}$$

$$10.60 \quad \text{INVALID-ORDER-60} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + C_L R_4 s + 2}$$

$$10.61 \quad \text{INVALID-ORDER-61} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

$$H(s) = \frac{R_L (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 C_L L_4 R_4 R_L s^3 + C_4 L_4 R_4 s^2 + 2C_4 L_4 R_L s^2 + C_L L_4 R_L s^2 + C_L R_4 R_L s + L_4 s + R_4 + 2R_L}$$

$$10.62 \quad \text{INVALID-ORDER-62} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_L R_L s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 C_L L_4 R_4 s^3 + 2C_4 C_L L_4 R_L s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + C_L R_4 s + 2C_L R_L s + 2}$$

$$10.63 \quad \text{INVALID-ORDER-63} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, L_L s + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_L L_L s^2 + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + 2C_L L_L s^2 + C_L R_4 s + 2}$$

$$10.64 \quad \text{INVALID-ORDER-64} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

$$H(s) = \frac{L_L s (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 C_L L_4 L_L R_4 s^4 + 2C_4 L_4 L_L s^3 + C_4 L_4 R_4 s^2 + C_L L_4 L_L s^3 + C_L L_L R_4 s^2 + L_4 s + 2L_L s + R_4}$$

$$10.65 \quad \text{INVALID-ORDER-65} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{(C_L L_L s^2 + C_L R_L s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_4 s^3 + 2C_4 C_L L_4 R_L s^3 + 2C_4 L_4 s^2 + C_L L_4 s^2 + 2C_L L_L s^2 + C_L R_4 s + 2C_L R_L s + 2}$$

$$10.66 \quad \text{INVALID-ORDER-66} \quad Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$$

$$H(s) = \frac{L_L R_L s (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 C_L L_4 L_L R_4 R_L s^4 + C_4 L_4 L_L R_4 s^3 + 2C_4 L_4 L_L R_L s^3 + C_4 L_4 R_4 R_L s^2 + C_L L_4 L_L R_L s^3 + C_L L_L R_4 R_L s^2 + L_4 L_L s^2 + L_4 R_L s + L_L R_4 s + 2L_L R_L s + R_4 R_L}$$

10.67 INVALID-ORDER-67 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$

$$H(s) = \frac{(C_4 L_4 R_4 s^2 + L_4 s + R_4) (C_L L_L R_L s^2 + L_L s + R_L)}{C_4 C_L L_4 L_L R_4 s^4 + 2 C_4 C_L L_4 L_L R_L s^4 + 2 C_4 L_4 L_L s^3 + C_4 L_4 R_4 s^2 + 2 C_4 L_4 R_L s^2 + C_L L_4 L_L s^3 + C_L L_L R_4 s^2 + 2 C_L L_L R_L s^2 + L_4 s + 2 L_L s + R_4 + 2 R_L}$$

10.68 INVALID-ORDER-68 $Z(s) = \left(\infty, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \frac{R_L (L_L s + \frac{1}{C_L s})}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{R_L (C_L L_L s^2 + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{C_4 C_L L_4 L_L R_4 s^4 + 2 C_4 C_L L_4 L_L R_L s^4 + C_4 C_L L_4 R_4 R_L s^3 + C_4 L_4 R_4 s^2 + 2 C_4 L_4 R_L s^2 + C_L L_4 L_L s^3 + C_L L_4 R_L s^2 + C_L L_L R_4 s^2 + 2 C_L L_L R_L s^2 + C_L R_4 R_L s + L_4 s + R_4 + 2 R_L}$$

10.69 INVALID-ORDER-69 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 R_4 s^3 + 2 C_4 L_4 s^2 + 2 C_4 R_4 s + C_L R_4 s + 2}$$

10.70 INVALID-ORDER-70 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

$$H(s) = \frac{R_4 R_L (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 R_4 R_L s^3 + C_4 L_4 R_4 s^2 + 2 C_4 L_4 R_L s^2 + 2 C_4 R_4 R_L s + C_L R_4 R_L s + R_4 + 2 R_L}$$

10.71 INVALID-ORDER-71 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_4 L_4 s^2 + 1) (C_L R_L s + 1)}{C_4 C_L L_4 R_4 s^3 + 2 C_4 C_L L_4 R_L s^3 + 2 C_4 C_L R_4 R_L s^2 + 2 C_4 L_4 s^2 + 2 C_4 R_4 s + C_L R_4 s + 2 C_L R_L s + 2}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, L_L s + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_4 L_4 s^2 + 1) (C_L L_L s^2 + 1)}{2 C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_4 s^3 + 2 C_4 C_L L_L R_4 s^3 + 2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2 C_L L_L s^2 + C_L R_4 s + 2}$$

10.73 INVALID-ORDER-73 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

$$H(s) = \frac{L_L R_4 s (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 L_L R_4 s^4 + 2 C_4 L_4 L_L s^3 + C_4 L_4 R_4 s^2 + 2 C_4 L_L R_4 s^2 + C_L L_L R_4 s^2 + 2 L_L s + R_4}$$

10.74 INVALID-ORDER-74 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 (L_4 s + \frac{1}{C_4 s})}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{R_4 (C_4 L_4 s^2 + 1) (C_L L_L s^2 + C_L R_L s + 1)}{2 C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_4 s^3 + 2 C_4 C_L L_4 R_L s^3 + 2 C_4 C_L L_L R_4 s^3 + 2 C_4 C_L R_4 R_L s^2 + 2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2 C_L L_L s^2 + C_L R_4 s + 2 C_L R_L s + 2}$$

10.75 INVALID-ORDER-75 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 \left(L_4 s + \frac{1}{C_4 s} \right)}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

$$H(s) = \frac{L_L R_4 R_L s (C_4 L_4 s^2 + 1)}{C_4 C_L L_4 L_L R_4 R_L s^4 + C_4 L_4 L_L R_4 s^3 + 2C_4 L_4 L_L R_L s^3 + C_4 L_4 R_4 R_L s^2 + 2C_4 L_L R_4 R_L s^2 + C_L L_L R_4 R_L s^2 + L_L R_4 s + 2L_L R_L s + R_4 R_L}$$

10.76 INVALID-ORDER-76 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 \left(L_4 s + \frac{1}{C_4 s} \right)}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{L_L s}{C_L L_L s^2 + 1} + R_L \right)$

$$H(s) = \frac{R_4 (C_4 L_4 s^2 + 1) (C_L L_L R_L s^2 + L_L s + R_L)}{C_4 C_L L_4 L_L R_4 s^4 + 2C_4 C_L L_4 L_L R_L s^4 + 2C_4 C_L L_L R_4 R_L s^3 + 2C_4 L_4 L_L s^3 + C_4 L_4 R_4 s^2 + 2C_4 L_4 R_L s^2 + 2C_4 L_L R_4 s^2 + 2C_4 R_4 R_L s + C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + 2L_L s + R_4 + 2R_L}$$

10.77 INVALID-ORDER-77 $Z(s) = \left(\infty, \infty, \infty, \frac{R_4 \left(L_4 s + \frac{1}{C_4 s} \right)}{L_4 s + R_4 + \frac{1}{C_4 s}}, \infty, \frac{R_L \left(L_L s + \frac{1}{C_L s} \right)}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{R_4 R_L (C_4 L_4 s^2 + 1) (C_L L_L s^2 + 1)}{C_4 C_L L_4 L_L R_4 s^4 + 2C_4 C_L L_4 L_L R_L s^4 + C_4 C_L L_4 R_4 R_L s^3 + 2C_4 C_L L_L R_4 R_L s^3 + C_4 L_4 R_4 s^2 + 2C_4 L_4 R_L s^2 + 2C_4 R_4 R_L s + C_L L_L R_4 s^2 + 2C_L L_L R_L s^2 + C_L R_4 R_L s + R_4 + 2R_L}$$