

Filter Summary Report: TIA,simple,Z1,Z4

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10.90INVALID-ORDER-90	$Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	18

1 Examined $H(z)$ for TIA simple Z1 Z4: $\frac{Z_1 Z_4 g_m}{2Z_1 g_m + 2}$

$$H(z) = \frac{Z_1 Z_4 g_m}{2Z_1 g_m + 2}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(R_1, \infty, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

$$H(s) = \frac{L_4 R_1 R_4 g_m s}{2(R_1 g_m + 1)(C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

Parameters:

Q: $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$
 wo: $\sqrt{\frac{1}{C_4 L_4}}$
 bandwidth: $\frac{1}{C_4 R_4}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 Qz: 0
 Wz: None

3.2 BP-2 $Z(s) = \left(L_1 s, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$

$$H(s) = \frac{L_1 R_4 g_m s}{2(C_4 R_4 s + 1)(L_1 g_m s + 1)}$$

Parameters:

Q: $\frac{C_4 L_1 R_4 g_m \sqrt{\frac{1}{C_4 L_1 R_4 g_m}}}{C_4 R_4 + L_1 g_m}$
 wo: $\sqrt{\frac{1}{C_4 L_1 R_4 g_m}}$
 bandwidth: $\frac{C_4 R_4 + L_1 g_m}{C_4 L_1 R_4 g_m}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{L_1 R_4 g_m}{2(C_4 R_4 + L_1 g_m)}$
 Qz: 0
 Wz: None

3.3 BP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \infty, R_4, \infty, \infty \right)$

$$H(s) = \frac{L_1 R_4 g_m s}{2(C_1 L_1 s^2 + L_1 g_m s + 1)}$$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_4}{2}$
 Qz: 0

Wz: None

$$\mathbf{3.4 \quad BP-4} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad R_4, \quad \infty, \quad \infty \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_1 L_1}} \\ \text{bandwidth: } & \frac{R_1 g_m + 1}{C_1 R_1} \\ \text{K-LP: } & 0 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & \frac{R_1 R_4 g_m}{2(R_1 g_m + 1)} \\ \text{Qz: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{L_1 R_1 R_4 g_m s}{2(C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

4 LP

$$\mathbf{4.1 \quad LP-1} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_1 C_4 R_4 \sqrt{\frac{g_m}{C_1 C_4 R_4}}}{C_1 + C_4 R_4 g_m} \\ \text{wo: } & \sqrt{\frac{g_m}{C_1 C_4 R_4}} \\ \text{bandwidth: } & \frac{C_1 + C_4 R_4 g_m}{C_1 C_4 R_4} \\ \text{K-LP: } & \frac{R_4}{2} \\ \text{K-HP: } & 0 \\ \text{K-BP: } & 0 \\ \text{Qz: } & \text{None} \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{R_4 g_m}{2(C_1 s + g_m)(C_4 R_4 s + 1)}$$

$$\mathbf{4.2 \quad LP-2} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_1 C_4 R_1 R_4 \sqrt{\frac{R_1 g_m + 1}{C_1 C_4 R_1 R_4}}}{C_1 R_1 + C_4 R_1 R_4 g_m + C_4 R_4} \\ \text{wo: } & \sqrt{\frac{R_1 g_m + 1}{C_1 C_4 R_1 R_4}} \\ \text{bandwidth: } & \frac{C_1 R_1 + C_4 R_1 R_4 g_m + C_4 R_4}{C_1 C_4 R_1 R_4} \\ \text{K-LP: } & \frac{R_1 R_4 g_m}{2(R_1 g_m + 1)} \\ \text{K-HP: } & 0 \\ \text{K-BP: } & 0 \\ \text{Qz: } & \text{None} \\ \text{Wz: } & \text{None} \end{aligned}$$

$$H(s) = \frac{R_1 R_4 g_m}{2(C_4 R_4 s + 1)(C_1 R_1 s + R_1 g_m + 1)}$$

4.3 LP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1}$
 K-LP: $\frac{L_1 g_m}{2 C_4}$
 K-HP: 0
 K-BP: 0
 Qz: None
 Wz: None

4.4 LP-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{R_1 g_m + 1}{C_1 R_1}$
 K-LP: $\frac{L_1 g_m}{2 C_4}$
 K-HP: 0
 K-BP: 0
 Qz: None
 Wz: None

5 BS

5.1 BS-1 $Z(s) = \left(R_1, \infty, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$

Parameters:

Q: $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$
 wo: $\sqrt{\frac{1}{C_4 L_4}}$
 bandwidth: $\frac{R_4}{L_4}$
 K-LP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-HP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{L_1 g_m}{2 C_4 (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

$$H(s) = \frac{L_1 R_1 g_m}{2 C_4 (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$H(s) = \frac{R_1 R_4 g_m (C_4 L_4 s^2 + 1)}{2 (R_1 g_m + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}$$

5.2 BS-2 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \infty, R_4, \infty, \infty \right)$

Parameters:

Q: $L_1 g_m \sqrt{\frac{1}{C_1 L_1}}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{1}{L_1 g_m}$
 K-LP: $\frac{R_4}{2}$
 K-HP: $\frac{\tilde{R}_4}{2}$
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_1 L_1}}$

5.3 BS-3 $Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, R_4, \infty, \infty \right)$

Parameters:

Q: $\frac{L_1 \sqrt{\frac{1}{C_1 L_1}} (R_1 g_m + 1)}{R_1}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{R_1}{L_1 (R_1 g_m + 1)}$
 K-LP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-HP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_1 L_1}}$

6 GE

6.1 GE-1 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \infty, R_4, \infty, \infty \right)$

Parameters:

Q: $\frac{L_1 g_m \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{R_1 g_m + 1}{L_1 g_m}$
 K-LP: $\frac{R_4}{2}$
 K-HP: $\frac{\tilde{R}_4}{2}$
 K-BP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 Qz: $\frac{L_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1}$
 Wz: $\sqrt{\frac{1}{C_1 L_1}}$

$$H(s) = \frac{R_4 g_m (C_1 L_1 s^2 + 1)}{2 (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$H(s) = \frac{R_1 R_4 g_m (C_1 L_1 s^2 + 1)}{2 (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$H(s) = \frac{R_4 g_m (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

6.2 GE-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, \infty, R_4, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}} (R_1 g_m + 1)}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1 (R_1 g_m + 1)}$
 K-LP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-HP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 K-BP: $\frac{R_4}{2}$
 Qz: $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$
 Wz: $\sqrt{\frac{1}{C_1 L_1}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 C_4 R_4 \sqrt{\frac{g_m}{C_1 C_4 R_4 (R_1 g_m + 1)}} (R_1 g_m + 1)}{C_1 R_1 g_m + C_1 + C_4 R_4 g_m}$
 wo: $\sqrt{\frac{g_m}{C_1 C_4 R_4 (R_1 g_m + 1)}}$
 bandwidth: $\frac{C_1 R_1 g_m + C_1 + C_4 R_4 g_m}{C_1 C_4 R_4 (R_1 g_m + 1)}$
 K-LP: $\frac{R_4}{2}$
 K-HP: 0
 K-BP: $\frac{C_1 R_1 R_4 g_m}{2(C_1 R_1 g_m + C_1 + C_4 R_4 g_m)}$
 Qz: 0
 Wz: None

8.2 INVALID-NUMER-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1}$
 K-LP: $\frac{L_1 g_m}{2C_4}$
 K-HP: 0
 K-BP: $\frac{R_4}{2}$
 Qz: 0
 Wz: None

$$H(s) = \frac{R_4 g_m (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$H(s) = \frac{R_4 g_m (C_1 R_1 s + 1)}{2 (C_4 R_4 s + 1) (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$H(s) = \frac{L_1 g_m (C_4 R_4 s + 1)}{2 C_4 (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

8.3 INVALID-NUMER-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{L_1 R_1 g_m (C_4 R_4 s + 1)}{2C_4 (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

Parameters:

Q: $\frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{R_1 g_m + 1}{C_1 R_1}$
 K-LP: $\frac{L_1 g_m}{2C_4}$
 K-HP: 0
 K-BP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 Qz: 0
 Wz: None

9 INVALID-WZ

9.1 INVALID-WZ-1 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{L_1 g_m (C_4 L_4 s^2 + 1)}{2C_4 (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1}$
 K-LP: $\frac{L_1 g_m}{2C_4}$
 K-HP: $\frac{L_4 g_m}{2C_1}$
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_4 L_4}}$

9.2 INVALID-WZ-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{L_1 g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2C_4 (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{g_m}{C_1}$
 K-LP: $\frac{L_1 g_m}{2C_4}$
 K-HP: $\frac{L_4 g_m}{2C_1}$
 K-BP: $\frac{R_4}{2}$
 Qz: $\frac{L_4 \sqrt{\frac{1}{C_1 L_1}}}{R_4}$
 Wz: $\sqrt{\frac{1}{C_4 L_4}}$

9.3 INVALID-WZ-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_1 L_1}} \\ \text{bandwidth: } & \frac{R_1 g_m + 1}{C_1 R_1} \\ \text{K-LP: } & \frac{L_1 g_m}{2 C_4} \\ \text{K-HP: } & \frac{L_4 g_m}{2 C_1} \\ \text{K-BP: } & 0 \\ \text{Qz: } & \text{None} \\ \text{Wz: } & \sqrt{\frac{1}{C_4 L_4}} \end{aligned}$$

$$H(s) = \frac{L_1 R_1 g_m (C_4 L_4 s^2 + 1)}{2 C_4 (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

9.4 INVALID-WZ-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_1 L_1}} \\ \text{bandwidth: } & \frac{R_1 g_m + 1}{C_1 R_1} \\ \text{K-LP: } & \frac{L_1 g_m}{2 C_4} \\ \text{K-HP: } & \frac{L_4 g_m}{2 C_1} \\ \text{K-BP: } & \frac{R_1 R_4 g_m}{2 (R_1 g_m + 1)} \\ \text{Qz: } & \frac{L_4 \sqrt{\frac{1}{C_1 L_1}}}{R_4} \\ \text{Wz: } & \sqrt{\frac{1}{C_4 L_4}} \end{aligned}$$

$$H(s) = \frac{L_1 R_1 g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (R_1, \infty, \infty, R_4, \infty, \infty)$

$$H(s) = \frac{R_1 R_4 g_m}{2 (R_1 g_m + 1)}$$

10.2 INVALID-ORDER-2 $Z(s) = \left(R_1, \infty, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{R_1 g_m}{2 C_4 s (R_1 g_m + 1)}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(R_1, \infty, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$

$$H(s) = \frac{R_1 R_4 g_m}{2 (R_1 g_m + 1) (C_4 R_4 s + 1)}$$

$$\textbf{10.4 INVALID-ORDER-4 } Z(s) = \left(R_1, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 R_4 s + 1)}{2 C_4 s (R_1 g_m + 1)}$$

$$\textbf{10.5 INVALID-ORDER-5 } Z(s) = \left(R_1, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 s^2 + 1)}{2 C_4 s (R_1 g_m + 1)}$$

$$\textbf{10.6 INVALID-ORDER-6 } Z(s) = \left(R_1, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{L_4 R_1 g_m s}{2 (R_1 g_m + 1) (C_4 L_4 s^2 + 1)}$$

$$\textbf{10.7 INVALID-ORDER-7 } Z(s) = \left(R_1, \infty, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (R_1 g_m + 1)}$$

$$\textbf{10.8 INVALID-ORDER-8 } Z(s) = \left(R_1, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \infty, \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (R_1 g_m + 1) (C_4 L_4 s^2 + 1)}$$

$$\textbf{10.9 INVALID-ORDER-9 } Z(s) = (L_1 s, \infty, \infty, R_4, \infty, \infty)$$

$$H(s) = \frac{L_1 R_4 g_m s}{2 (L_1 g_m s + 1)}$$

$$\textbf{10.10 INVALID-ORDER-10 } Z(s) = \left(L_1 s, \infty, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{L_1 g_m}{2 C_4 (L_1 g_m s + 1)}$$

$$\textbf{10.11 INVALID-ORDER-11 } Z(s) = \left(L_1 s, \infty, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{L_1 g_m (C_4 R_4 s + 1)}{2 C_4 (L_1 g_m s + 1)}$$

$$\textbf{10.12 INVALID-ORDER-12 } Z(s) = \left(L_1 s, \infty, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{L_1 g_m (C_4 L_4 s^2 + 1)}{2 C_4 (L_1 g_m s + 1)}$$

$$\textbf{10.13 INVALID-ORDER-13 } Z(s) = \left(L_1 s, \infty, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{L_1 L_4 g_m s^2}{2 (C_4 L_4 s^2 + 1) (L_1 g_m s + 1)}$$

$$10.14 \quad \text{INVALID-ORDER-14} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 (L_1 g_m s + 1)}$$

$$10.15 \quad \text{INVALID-ORDER-15} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_4 R_4 g_m s^2}{2 (L_1 g_m s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$10.16 \quad \text{INVALID-ORDER-16} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 g_m s (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (L_1 g_m s + 1)}$$

$$10.17 \quad \text{INVALID-ORDER-17} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_4 g_m s (C_4 L_4 s^2 + 1)}{2 (L_1 g_m s + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}$$

$$10.18 \quad \text{INVALID-ORDER-18} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m}{2 (C_1 s + g_m)}$$

$$10.19 \quad \text{INVALID-ORDER-19} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m}{2 C_4 s (C_1 s + g_m)}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 R_4 s + 1)}{2 C_4 s (C_1 s + g_m)}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 s^2 + 1)}{2 C_4 s (C_1 s + g_m)}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 g_m s}{2 (C_1 s + g_m) (C_4 L_4 s^2 + 1)}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 s + g_m)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_4 g_m s}{2 (C_1 s + g_m) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_1 s + g_m) (C_4 L_4 s^2 + 1)}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_4 L_4 s^2 + 1)}{2 (C_1 s + g_m) (C_4 L_4 s^2 + C_4 R_4 s + 1)}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 R_4 g_m}{2 (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m}{2 C_4 s (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.29 \quad \text{INVALID-ORDER-29} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 R_4 s + 1)}{2 C_4 s (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.30 \quad \text{INVALID-ORDER-30} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 s^2 + 1)}{2 C_4 s (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.31 \quad \text{INVALID-ORDER-31} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_1 g_m s}{2 (C_4 L_4 s^2 + 1) (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.32 \quad \text{INVALID-ORDER-32} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 R_1 s + R_1 g_m + 1)}$$

$$10.33 \quad \text{INVALID-ORDER-33} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_1 R_4 g_m s}{2 (C_1 R_1 s + R_1 g_m + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$\mathbf{10.34 \quad INVALID-ORDER-34} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 R_1 s + R_1 g_m + 1)}$$

$$\mathbf{10.35 \quad INVALID-ORDER-35} \quad Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 R_4 g_m (C_4 L_4 s^2 + 1)}{2 (C_1 R_1 s + R_1 g_m + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}$$

$$\mathbf{10.36 \quad INVALID-ORDER-36} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 R_1 s + 1)}{2 (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.37 \quad INVALID-ORDER-37} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 R_1 s + 1)}{2 C_4 s (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.38 \quad INVALID-ORDER-38} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 R_1 s + 1) (C_4 R_4 s + 1)}{2 C_4 s (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.39 \quad INVALID-ORDER-39} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 R_1 s + 1) (C_4 L_4 s^2 + 1)}{2 C_4 s (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.40 \quad INVALID-ORDER-40} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 g_m s (C_1 R_1 s + 1)}{2 (C_4 L_4 s^2 + 1) (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.41 \quad INVALID-ORDER-41} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 R_1 s + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$\mathbf{10.42 \quad INVALID-ORDER-42} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_4 g_m s (C_1 R_1 s + 1)}{2 (C_1 R_1 g_m s + C_1 s + g_m) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$10.43 \quad \text{INVALID-ORDER-43} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 R_1 s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.44 \quad \text{INVALID-ORDER-44} \quad Z(s) = \left(R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 R_1 s + 1) (C_4 L_4 s^2 + 1)}{2 (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.45 \quad \text{INVALID-ORDER-45} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.46 \quad \text{INVALID-ORDER-46} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 L_1 s^2 + 1)}{2 (C_4 R_4 s + 1) (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.47 \quad \text{INVALID-ORDER-47} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + 1) (C_4 R_4 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.48 \quad \text{INVALID-ORDER-48} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + 1) (C_4 L_4 s^2 + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.49 \quad \text{INVALID-ORDER-49} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 g_m s (C_1 L_1 s^2 + 1)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.50 \quad \text{INVALID-ORDER-50} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.51 \quad \text{INVALID-ORDER-51} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_4 g_m s (C_1 L_1 s^2 + 1)}{2 (C_1 L_1 g_m s^2 + C_1 s + g_m) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$10.52 \quad \text{INVALID-ORDER-52} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.53 \quad \text{INVALID-ORDER-53} \quad Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 L_1 s^2 + 1) (C_4 L_4 s^2 + 1)}{2 (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 L_1 g_m s^2 + C_1 s + g_m)}$$

$$10.54 \quad \text{INVALID-ORDER-54} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_4 g_m s}{2 (C_4 R_4 s + 1) (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

$$10.55 \quad \text{INVALID-ORDER-55} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_4 g_m s^2}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

$$10.56 \quad \text{INVALID-ORDER-56} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_4 R_4 g_m s^2}{2 (C_1 L_1 s^2 + L_1 g_m s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}$$

$$10.57 \quad \text{INVALID-ORDER-57} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 g_m s (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 s^2 + L_1 g_m s + 1)}$$

$$10.58 \quad \text{INVALID-ORDER-58} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_4 g_m s (C_4 L_4 s^2 + 1)}{2 (C_1 L_1 s^2 + L_1 g_m s + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}$$

$$10.59 \quad \text{INVALID-ORDER-59} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.60 \quad \text{INVALID-ORDER-60} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 (C_4 R_4 s + 1) (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.61 \quad \text{INVALID-ORDER-61} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 R_4 s + 1) (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.62 \quad \text{INVALID-ORDER-62} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 s^2 + 1) (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.63 \quad \text{INVALID-ORDER-63} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 g_m s (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.64 \quad \text{INVALID-ORDER-64} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + C_1 R_1 s + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.65 \quad \text{INVALID-ORDER-65} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_4 g_m s (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 (C_4 L_4 R_4 s^2 + L_4 s + R_4) (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.66 \quad \text{INVALID-ORDER-66} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 s^2 + C_1 R_1 s + 1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.67 \quad \text{INVALID-ORDER-67} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_4 L_4 s^2 + 1) (C_1 L_1 s^2 + C_1 R_1 s + 1)}{2 (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m)}$$

$$10.68 \quad \text{INVALID-ORDER-68} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_1 R_4 g_m s}{2 (C_4 R_4 s + 1) (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$10.69 \quad \text{INVALID-ORDER-69} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_4 R_1 g_m s^2}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$\mathbf{10.70 \quad INVALID-ORDER-70} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_4 R_1 R_4 g_m s^2}{2 (C_4 L_4 R_4 s^2 + L_4 s + R_4) (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$\mathbf{10.71 \quad INVALID-ORDER-71} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_1 g_m s (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$\mathbf{10.72 \quad INVALID-ORDER-72} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 R_1 R_4 g_m s (C_4 L_4 s^2 + 1)}{2 (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)}$$

$$\mathbf{10.73 \quad INVALID-ORDER-73} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$\mathbf{10.74 \quad INVALID-ORDER-74} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 (C_4 R_4 s + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$\mathbf{10.75 \quad INVALID-ORDER-75} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 R_4 s + 1) (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$\mathbf{10.76 \quad INVALID-ORDER-76} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$\mathbf{10.77 \quad INVALID-ORDER-77} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 g_m s (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$\mathbf{10.78 \quad INVALID-ORDER-78} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$10.79 \quad \text{INVALID-ORDER-79} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_4 g_m s (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 (C_4 L_4 R_4 s^2 + L_4 s + R_4) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$10.80 \quad \text{INVALID-ORDER-80} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m (C_1 L_1 R_1 s^2 + L_1 s + R_1) (C_4 L_4 R_4 s^2 + L_4 s + R_4)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$10.81 \quad \text{INVALID-ORDER-81} \quad Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4 g_m (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 s^2 + L_1 s + R_1)}{2 (C_4 L_4 s^2 + C_4 R_4 s + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1)}$$

$$10.82 \quad \text{INVALID-ORDER-82} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_1 L_1 s^2 + 1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$10.83 \quad \text{INVALID-ORDER-83} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{R_4}{C_4 R_4 s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 R_4 g_m (C_1 L_1 s^2 + 1)}{2 (C_4 R_4 s + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$10.84 \quad \text{INVALID-ORDER-84} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_1 L_1 s^2 + 1) (C_4 R_4 s + 1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$10.85 \quad \text{INVALID-ORDER-85} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad L_4 s + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_1 L_1 s^2 + 1) (C_4 L_4 s^2 + 1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$10.86 \quad \text{INVALID-ORDER-86} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4 R_1 g_m s (C_1 L_1 s^2 + 1)}{2 (C_4 L_4 s^2 + 1) (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

$$10.87 \quad \text{INVALID-ORDER-87} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad L_4 s + R_4 + \frac{1}{C_4 s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m (C_1 L_1 s^2 + 1) (C_4 L_4 s^2 + C_4 R_4 s + 1)}{2 C_4 s (C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1)}$$

10.88 INVALID-ORDER-88 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \infty, \frac{L_4R_4s}{C_4L_4R_4s^2+L_4s+R_4}, \infty, \infty \right)$

$$H(s) = \frac{L_4R_1R_4g_ms(C_1L_1s^2+1)}{2(C_4L_4R_4s^2+L_4s+R_4)(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1)}$$

10.89 INVALID-ORDER-89 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \infty, \frac{L_4s}{C_4L_4s^2+1} + R_4, \infty, \infty \right)$

$$H(s) = \frac{R_1g_m(C_1L_1s^2+1)(C_4L_4R_4s^2+L_4s+R_4)}{2(C_4L_4s^2+1)(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1)}$$

10.90 INVALID-ORDER-90 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \infty, \frac{R_4(C_4L_4s^2+1)}{C_4L_4s^2+C_4R_4s+1}, \infty, \infty \right)$

$$H(s) = \frac{R_1R_4g_m(C_1L_1s^2+1)(C_4L_4s^2+1)}{2(C_4L_4s^2+C_4R_4s+1)(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1)}$$

11 PolynomialError