

Filter Summary Report: CG,TIA,simple,Z1,Z4

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Contents

1 Examined $H(z)$ for CG 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 $Z(s) = \left(R_1, \infty, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

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

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

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

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

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

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

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

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: 0
 K-HP: 0
 K-BP: $\frac{R_1 R_4 g_m}{2(R_1 g_m + 1)}$
 Qz: 0
 Wz: None

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

4 LP

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

Parameters:

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

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

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

Parameters:

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

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

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

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

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

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

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: $\sqrt{\frac{1}{C_4 L_4}}$

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

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: $\frac{R_4}{2}$
 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: $\frac{R_4}{2}$
 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: $\sqrt{\frac{1}{C_1 L_1}}$

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

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

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

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

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

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

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

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

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

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: $\frac{R_4}{2}$
 Qz: 0
 Wz: None

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

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

Parameters:

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

9 INVALID-WZ

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

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

Parameters:

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

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

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

Parameters:

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

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

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

Parameters:

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

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

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

Parameters:

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

10 INVALID-ORDER

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$H(s) = \frac{L_1 L_4 g_m s^2}{2 C_4 L_1 L_4 g_m s^3 + 2 C_4 L_4 s^2 + 2 L_1 g_m s + 2}$$

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

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

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

$$H(s) = \frac{L_1 L_4 R_4 g_m s^2}{2 C_4 L_1 L_4 R_4 g_m s^3 + 2 R_4 + s^2 (2 C_4 L_4 R_4 + 2 L_1 L_4 g_m) + s (2 L_1 R_4 g_m + 2 L_4)}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_4 g_m s^3 + L_1 L_4 g_m s^2 + L_1 R_4 g_m s}{2 C_4 L_1 L_4 g_m s^3 + 2 C_4 L_4 s^2 + 2 L_1 g_m s + 2}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_4 g_m s^3 + L_1 R_4 g_m s}{2 C_4 L_1 L_4 g_m s^3 + s^2 (2 C_4 L_1 R_4 g_m + 2 C_4 L_4) + s (2 C_4 R_4 + 2 L_1 g_m) + 2}$$

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

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

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

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

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

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

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

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

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

$$H(s) = \frac{L_4 g_m s}{2 C_1 C_4 L_4 s^3 + 2 C_1 s + 2 C_4 L_4 g_m s^2 + 2 g_m}$$

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

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

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

$$H(s) = \frac{L_4 R_4 g_m s}{2C_1 C_4 L_4 R_4 s^3 + 2R_4 g_m + s^2 (2C_1 L_4 + 2C_4 L_4 R_4 g_m) + s (2C_1 R_4 + 2L_4 g_m)}$$

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

$$H(s) = \frac{C_4 L_4 R_4 g_m s^2 + L_4 g_m s + R_4 g_m}{2C_1 C_4 L_4 s^3 + 2C_1 s + 2C_4 L_4 g_m s^2 + 2g_m}$$

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

$$H(s) = \frac{C_4 L_4 R_4 g_m s^2 + R_4 g_m}{2C_1 C_4 L_4 s^3 + 2g_m + s^2 (2C_1 C_4 R_4 + 2C_4 L_4 g_m) + s (2C_1 + 2C_4 R_4 g_m)}$$

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

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

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

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

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

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

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

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

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

$$H(s) = \frac{L_4 R_1 g_m s}{2C_1 C_4 L_4 R_1 s^3 + 2C_1 R_1 s + 2R_1 g_m + s^2 (2C_4 L_4 R_1 g_m + 2C_4 L_4) + 2}$$

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

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

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

$$H(s) = \frac{L_4 R_1 R_4 g_m s}{2C_1 C_4 L_4 R_1 R_4 s^3 + 2R_1 R_4 g_m + 2R_4 + s^2 (2C_1 L_4 R_1 + 2C_4 L_4 R_1 R_4 g_m + 2C_4 L_4 R_4) + s (2C_1 R_1 R_4 + 2L_4 R_1 g_m + 2L_4)}$$

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

$$H(s) = \frac{C_4 L_4 R_1 R_4 g_m s^2 + L_4 R_1 g_m s + R_1 R_4 g_m}{2 C_1 C_4 L_4 R_1 s^3 + 2 C_1 R_1 s + 2 R_1 g_m + s^2 (2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{C_4 L_4 R_1 R_4 g_m s^2 + R_1 R_4 g_m}{2 C_1 C_4 L_4 R_1 s^3 + 2 R_1 g_m + s^2 (2 C_1 C_4 R_1 R_4 + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + s (2 C_1 R_1 + 2 C_4 R_1 R_4 g_m + 2 C_4 R_4) + 2}$$

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

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

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

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

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

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

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

$$H(s) = \frac{C_1 C_4 L_4 R_1 g_m s^3 + C_1 R_1 g_m s + C_4 L_4 g_m s^2 + g_m}{2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 L_4 R_1 g_m s^2 + L_4 g_m s}{2 C_4 L_4 g_m s^2 + 2 g_m + s^3 (2 C_1 C_4 L_4 R_1 g_m + 2 C_1 C_4 L_4) + s (2 C_1 R_1 g_m + 2 C_1)}$$

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

$$H(s) = \frac{C_1 C_4 L_4 R_1 g_m s^3 + g_m + s^2 (C_1 C_4 R_1 R_4 g_m + C_4 L_4 g_m) + s (C_1 R_1 g_m + C_4 R_4 g_m)}{2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 L_4 R_1 R_4 g_m s^2 + L_4 R_4 g_m s}{2 R_4 g_m + s^3 (2 C_1 C_4 L_4 R_1 R_4 g_m + 2 C_1 C_4 L_4 R_4) + s^2 (2 C_1 L_4 R_1 g_m + 2 C_1 L_4 + 2 C_4 L_4 R_4 g_m) + s (2 C_1 R_1 R_4 g_m + 2 C_1 R_4 + 2 L_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_4 R_1 R_4 g_m s^3 + R_4 g_m + s^2 (C_1 L_4 R_1 g_m + C_4 L_4 R_4 g_m) + s (C_1 R_1 R_4 g_m + L_4 g_m)}{2 C_4 L_4 g_m s^2 + 2 g_m + s^3 (2 C_1 C_4 L_4 R_1 g_m + 2 C_1 C_4 L_4) + s (2 C_1 R_1 g_m + 2 C_1)}$$

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

$$H(s) = \frac{C_1 C_4 L_4 R_1 R_4 g_m s^3 + C_1 R_1 R_4 g_m s + C_4 L_4 R_4 g_m s^2 + R_4 g_m}{2g_m + s^3 (2C_1 C_4 L_4 R_1 g_m + 2C_1 C_4 L_4) + s^2 (2C_1 C_4 R_1 R_4 g_m + 2C_1 C_4 R_4 + 2C_4 L_4 g_m) + s (2C_1 R_1 g_m + 2C_1 + 2C_4 R_4 g_m)}$$

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

$$H(s) = \frac{C_1 L_1 g_m s^2 + g_m}{2C_1 C_4 L_1 g_m s^3 + 2C_1 C_4 s^2 + 2C_4 g_m s}$$

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

$$H(s) = \frac{C_1 L_1 R_4 g_m s^2 + R_4 g_m}{2C_1 C_4 L_1 R_4 g_m s^3 + 2g_m + s^2 (2C_1 C_4 R_4 + 2C_1 L_1 g_m) + s (2C_1 + 2C_4 R_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 R_4 g_m s^3 + C_1 L_1 g_m s^2 + C_4 R_4 g_m s + g_m}{2C_1 C_4 L_1 g_m s^3 + 2C_1 C_4 s^2 + 2C_4 g_m s}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 g_m s^4 + g_m + s^2 (C_1 L_1 g_m + C_4 L_4 g_m)}{2C_1 C_4 L_1 g_m s^3 + 2C_1 C_4 s^2 + 2C_4 g_m s}$$

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

$$H(s) = \frac{C_1 L_1 L_4 g_m s^3 + L_4 g_m s}{2C_1 C_4 L_1 L_4 g_m s^4 + 2C_1 C_4 L_4 s^3 + 2C_1 s + 2g_m + s^2 (2C_1 L_1 g_m + 2C_4 L_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 g_m s^4 + C_1 C_4 L_1 R_4 g_m s^3 + C_4 R_4 g_m s + g_m + s^2 (C_1 L_1 g_m + C_4 L_4 g_m)}{2C_1 C_4 L_1 g_m s^3 + 2C_1 C_4 s^2 + 2C_4 g_m s}$$

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

$$H(s) = \frac{C_1 L_1 L_4 R_4 g_m s^3 + L_4 R_4 g_m s}{2C_1 C_4 L_1 L_4 R_4 g_m s^4 + 2R_4 g_m + s^3 (2C_1 C_4 L_4 R_4 + 2C_1 L_1 L_4 g_m) + s^2 (2C_1 L_1 R_4 g_m + 2C_1 L_4 + 2C_4 L_4 R_4 g_m) + s (2C_1 R_4 + 2L_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_4 g_m s^4 + C_1 L_1 L_4 g_m s^3 + L_4 g_m s + R_4 g_m + s^2 (C_1 L_1 R_4 g_m + C_4 L_4 R_4 g_m)}{2C_1 C_4 L_1 L_4 g_m s^4 + 2C_1 C_4 L_4 s^3 + 2C_1 s + 2g_m + s^2 (2C_1 L_1 g_m + 2C_4 L_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_4 g_m s^4 + R_4 g_m + s^2 (C_1 L_1 R_4 g_m + C_4 L_4 R_4 g_m)}{2 C_1 C_4 L_1 L_4 g_m s^4 + 2 g_m + s^3 (2 C_1 C_4 L_1 R_4 g_m + 2 C_1 C_4 L_4) + s^2 (2 C_1 C_4 R_4 + 2 C_1 L_1 g_m + 2 C_4 L_4 g_m) + s (2 C_1 + 2 C_4 R_4 g_m)}$$

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

$$H(s) = \frac{L_1 R_4 g_m s}{2 C_1 C_4 L_1 R_4 s^3 + s^2 (2 C_1 L_1 + 2 C_4 L_1 R_4 g_m) + s (2 C_4 R_4 + 2 L_1 g_m) + 2}$$

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

$$H(s) = \frac{L_1 L_4 g_m s^2}{2 C_1 C_4 L_1 L_4 s^4 + 2 C_4 L_1 L_4 g_m s^3 + 2 L_1 g_m s + s^2 (2 C_1 L_1 + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{L_1 L_4 R_4 g_m s^2}{2 C_1 C_4 L_1 L_4 R_4 s^4 + 2 R_4 + s^3 (2 C_1 L_1 L_4 + 2 C_4 L_1 L_4 R_4 g_m) + s^2 (2 C_1 L_1 R_4 + 2 C_4 L_4 R_4 + 2 L_1 L_4 g_m) + s (2 L_1 R_4 g_m + 2 L_4)}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_4 g_m s^3 + L_1 L_4 g_m s^2 + L_1 R_4 g_m s}{2 C_1 C_4 L_1 L_4 s^4 + 2 C_4 L_1 L_4 g_m s^3 + 2 L_1 g_m s + s^2 (2 C_1 L_1 + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_4 g_m s^3 + L_1 R_4 g_m s}{2 C_1 C_4 L_1 L_4 s^4 + s^3 (2 C_1 C_4 L_1 R_4 + 2 C_4 L_1 L_4 g_m) + s^2 (2 C_1 L_1 + 2 C_4 L_1 R_4 g_m + 2 C_4 L_4) + s (2 C_4 R_4 + 2 L_1 g_m) + 2}$$

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

$$H(s) = \frac{C_1 L_1 g_m s^2 + C_1 R_1 g_m s + g_m}{2 C_1 C_4 L_1 g_m s^3 + 2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 R_4 g_m s^2 + C_1 R_1 R_4 g_m s + R_4 g_m}{2 C_1 C_4 L_1 R_4 g_m s^3 + 2 g_m + s^2 (2 C_1 C_4 R_1 R_4 g_m + 2 C_1 C_4 R_4 + 2 C_1 L_1 g_m) + s (2 C_1 R_1 g_m + 2 C_1 + 2 C_4 R_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 R_4 g_m s^3 + g_m + s^2 (C_1 C_4 R_1 R_4 g_m + C_1 L_1 g_m) + s (C_1 R_1 g_m + C_4 R_4 g_m)}{2 C_1 C_4 L_1 g_m s^3 + 2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 g_m s^4 + C_1 C_4 L_4 R_1 g_m s^3 + C_1 R_1 g_m s + g_m + s^2 (C_1 L_1 g_m + C_4 L_4 g_m)}{2 C_1 C_4 L_1 g_m s^3 + 2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 L_4 g_m s^3 + C_1 L_4 R_1 g_m s^2 + L_4 g_m s}{2 C_1 C_4 L_1 L_4 g_m s^4 + 2 g_m + s^3 (2 C_1 C_4 L_4 R_1 g_m + 2 C_1 C_4 L_4) + s^2 (2 C_1 L_1 g_m + 2 C_4 L_4 g_m) + s (2 C_1 R_1 g_m + 2 C_1)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 g_m s^4 + g_m + s^3 (C_1 C_4 L_1 R_4 g_m + C_1 C_4 L_4 R_1 g_m) + s^2 (C_1 C_4 R_1 R_4 g_m + C_1 L_1 g_m + C_4 L_4 g_m) + s (C_1 R_1 g_m + C_4 R_4 g_m)}{2 C_1 C_4 L_1 g_m s^3 + 2 C_4 g_m s + s^2 (2 C_1 C_4 R_1 g_m + 2 C_1 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 L_4 R_4 g_m s^3 + C_1 L_4 R_1 R_4 g_m s^2 + L_4 R_4 g_m s}{2 C_1 C_4 L_1 L_4 R_4 g_m s^4 + 2 R_4 g_m + s^3 (2 C_1 C_4 L_4 R_1 R_4 g_m + 2 C_1 C_4 L_4 R_4 + 2 C_1 L_1 L_4 g_m) + s^2 (2 C_1 L_1 R_4 g_m + 2 C_1 L_4 R_1 g_m + 2 C_1 L_4 + 2 C_4 L_4 R_4 g_m) + s (2 C_1 R_1 R_4 g_m + 2 C_1 R_4 + 2 L_4 g_m)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_4 g_m s^4 + R_4 g_m + s^3 (C_1 C_4 L_4 R_1 R_4 g_m + C_1 L_1 L_4 g_m) + s^2 (C_1 L_1 R_4 g_m + C_1 L_4 R_1 g_m + C_4 L_4 R_4 g_m) + s (C_1 R_1 R_4 g_m + L_4 g_m)}{2 C_1 C_4 L_1 L_4 g_m s^4 + 2 g_m + s^3 (2 C_1 C_4 L_4 R_1 g_m + 2 C_1 C_4 L_4) + s^2 (2 C_1 L_1 g_m + 2 C_4 L_4 g_m) + s (2 C_1 R_1 g_m + 2 C_1)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_4 g_m s^4 + C_1 C_4 L_4 R_1 R_4 g_m s^3 + C_1 R_1 R_4 g_m s + R_4 g_m + s^2 (C_1 L_1 R_4 g_m + C_4 L_4 R_4 g_m)}{2 C_1 C_4 L_1 L_4 g_m s^4 + 2 g_m + s^3 (2 C_1 C_4 L_1 R_4 g_m + 2 C_1 C_4 L_4 R_1 g_m + 2 C_1 C_4 L_4) + s^2 (2 C_1 C_4 R_1 R_4 g_m + 2 C_1 C_4 R_4 + 2 C_1 L_1 g_m + 2 C_4 L_4 g_m) + s (2 C_1 R_1 g_m + 2 C_1 + 2 C_4 R_4 g_m)}$$

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

$$H(s) = \frac{L_1 R_1 R_4 g_m s}{2 C_1 C_4 L_1 R_1 R_4 s^3 + 2 R_1 + s^2 (2 C_1 L_1 R_1 + 2 C_4 L_1 R_1 R_4 g_m + 2 C_4 L_1 R_4) + s (2 C_4 R_1 R_4 + 2 L_1 R_1 g_m + 2 L_1)}$$

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

$$H(s) = \frac{L_1 L_4 R_1 g_m s^2}{2 C_1 C_4 L_1 L_4 R_1 s^4 + 2 R_1 + s^3 (2 C_4 L_1 L_4 R_1 g_m + 2 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 + 2 C_4 L_4 R_1) + s (2 L_1 R_1 g_m + 2 L_1)}$$

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

$$H(s) = \frac{L_1 L_4 R_1 R_4 g_m s^2}{2 C_1 C_4 L_1 L_4 R_1 R_4 s^4 + 2 R_1 R_4 + s^3 (2 C_1 L_1 L_4 R_1 + 2 C_4 L_1 L_4 R_1 R_4 g_m + 2 C_4 L_1 L_4 R_4) + s^2 (2 C_1 L_1 R_1 R_4 + 2 C_4 L_4 R_1 R_4 + 2 L_1 L_4 R_1 g_m + 2 L_1 L_4) + s (2 L_1 R_1 R_4 g_m + 2 L_1 R_4 + 2 L_4 R_1)}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_1 R_4 g_m s^3 + L_1 L_4 R_1 g_m s^2 + L_1 R_1 R_4 g_m s}{2 C_1 C_4 L_1 L_4 R_1 s^4 + 2 R_1 + s^3 (2 C_4 L_1 L_4 R_1 g_m + 2 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 + 2 C_4 L_4 R_1) + s (2 L_1 R_1 g_m + 2 L_1)}$$

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

$$H(s) = \frac{C_4 L_1 L_4 R_1 R_4 g_m s^3 + L_1 R_1 R_4 g_m s}{2 C_1 C_4 L_1 L_4 R_1 s^4 + 2 R_1 + s^3 (2 C_1 C_4 L_1 R_1 R_4 + 2 C_4 L_1 L_4 R_1 g_m + 2 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 + 2 C_4 L_1 R_1 R_4 g_m + 2 C_4 L_1 R_4 + 2 C_4 L_4 R_1) + s (2 C_4 R_1 R_4 + 2 L_1 R_1 g_m + 2 L_1)}$$

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

$$H(s) = \frac{C_1 L_1 R_1 g_m s^2 + L_1 g_m s + R_1 g_m}{2 C_4 L_1 g_m s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 R_1 R_4 g_m s^2 + L_1 R_4 g_m s + R_1 R_4 g_m}{2 R_1 g_m + s^3 (2 C_1 C_4 L_1 R_1 R_4 g_m + 2 C_1 C_4 L_1 R_4) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_1 R_4 g_m) + s (2 C_4 R_1 R_4 g_m + 2 C_4 R_4 + 2 L_1 g_m) + 2}$$

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

$$H(s) = \frac{C_1 C_4 L_1 R_1 R_4 g_m s^3 + R_1 g_m + s^2 (C_1 L_1 R_1 g_m + C_4 L_1 R_4 g_m) + s (C_4 R_1 R_4 g_m + L_1 g_m)}{2 C_4 L_1 g_m s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 g_m s^4 + C_4 L_1 L_4 g_m s^3 + L_1 g_m s + R_1 g_m + s^2 (C_1 L_1 R_1 g_m + C_4 L_4 R_1 g_m)}{2 C_4 L_1 g_m s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 L_4 R_1 g_m s^3 + L_1 L_4 g_m s^2 + L_4 R_1 g_m s}{2 C_4 L_1 L_4 g_m s^3 + 2 L_1 g_m s + 2 R_1 g_m + s^4 (2 C_1 C_4 L_1 L_4 R_1 g_m + 2 C_1 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 g_m s^4 + R_1 g_m + s^3 (C_1 C_4 L_1 R_1 R_4 g_m + C_4 L_1 L_4 g_m) + s^2 (C_1 L_1 R_1 g_m + C_4 L_1 R_4 g_m + C_4 L_4 R_1 g_m) + s (C_4 R_1 R_4 g_m + L_1 g_m)}{2 C_4 L_1 g_m s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 L_4 R_1 R_4 g_m s^3 + L_1 L_4 R_4 g_m s^2 + L_4 R_1 R_4 g_m s}{2 R_1 R_4 g_m + 2 R_4 + s^4 (2 C_1 C_4 L_1 L_4 R_1 R_4 g_m + 2 C_1 C_4 L_1 L_4 R_4) + s^3 (2 C_1 L_1 L_4 R_1 g_m + 2 C_1 L_1 L_4 + 2 C_4 L_1 L_4 R_4 g_m) + s^2 (2 C_1 L_1 R_1 R_4 g_m + 2 C_1 L_1 R_4 + 2 C_4 L_4 R_1 R_4 g_m + 2 C_4 L_4 R_4 + 2 L_1 L_4 g_m) + s (2 L_1 R_4 g_m + 2 L_4 R_1 g_m + 2 L_4)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 R_4 g_m s^4 + R_1 R_4 g_m + s^3 (C_1 L_1 L_4 R_1 g_m + C_4 L_1 L_4 R_4 g_m) + s^2 (C_1 L_1 R_1 R_4 g_m + C_4 L_4 R_1 R_4 g_m + L_1 L_4 g_m) + s (L_1 R_4 g_m + L_4 R_1 g_m)}{2 C_4 L_1 L_4 g_m s^3 + 2 L_1 g_m s + 2 R_1 g_m + s^4 (2 C_1 C_4 L_1 L_4 R_1 g_m + 2 C_1 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 R_4 g_m s^4 + C_4 L_1 L_4 R_4 g_m s^3 + L_1 R_4 g_m s + R_1 R_4 g_m + s^2 (C_1 L_1 R_1 R_4 g_m + C_4 L_4 R_1 R_4 g_m)}{2 R_1 g_m + s^4 (2 C_1 C_4 L_1 L_4 R_1 g_m + 2 C_1 C_4 L_1 L_4) + s^3 (2 C_1 C_4 L_1 R_1 R_4 g_m + 2 C_1 C_4 L_1 R_4 + 2 C_4 L_1 L_4 g_m) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_1 R_4 g_m + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + s (2 C_4 R_1 R_4 g_m + 2 C_4 R_4 + 2 L_1 g_m) + 2}$$

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

$$H(s) = \frac{C_1 L_1 R_1 g_m s^2 + R_1 g_m}{2 C_1 C_4 R_1 s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 R_1 R_4 g_m s^2 + R_1 R_4 g_m}{2 R_1 g_m + s^3 (2 C_1 C_4 L_1 R_1 R_4 g_m + 2 C_1 C_4 L_1 R_4) + s^2 (2 C_1 C_4 R_1 R_4 + 2 C_1 L_1 R_1 g_m + 2 C_1 L_1) + s (2 C_1 R_1 + 2 C_4 R_1 R_4 g_m + 2 C_4 R_4) + 2}$$

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

$$H(s) = \frac{C_1 C_4 L_1 R_1 R_4 g_m s^3 + C_1 L_1 R_1 g_m s^2 + C_4 R_1 R_4 g_m s + R_1 g_m}{2 C_1 C_4 R_1 s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 g_m s^4 + R_1 g_m + s^2 (C_1 L_1 R_1 g_m + C_4 L_4 R_1 g_m)}{2 C_1 C_4 R_1 s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

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

$$H(s) = \frac{C_1 L_1 L_4 R_1 g_m s^3 + L_4 R_1 g_m s}{2 C_1 C_4 L_4 R_1 s^3 + 2 C_1 R_1 s + 2 R_1 g_m + s^4 (2 C_1 C_4 L_1 L_4 R_1 g_m + 2 C_1 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + 2}$$

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

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 g_m s^4 + C_1 C_4 L_1 R_1 R_4 g_m s^3 + C_4 R_1 R_4 g_m s + R_1 g_m + s^2 (C_1 L_1 R_1 g_m + C_4 L_4 R_1 g_m)}{2 C_1 C_4 R_1 s^2 + s^3 (2 C_1 C_4 L_1 R_1 g_m + 2 C_1 C_4 L_1) + s (2 C_4 R_1 g_m + 2 C_4)}$$

$$10.88 \quad \text{INVALID-ORDER-88} \quad Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 L_1 L_4 R_1 R_4 g_m s^3 + L_4 R_1 R_4 g_m s}{2 R_1 R_4 g_m + 2 R_4 + s^4 (2 C_1 C_4 L_1 L_4 R_1 R_4 g_m + 2 C_1 C_4 L_1 L_4 R_4) + s^3 (2 C_1 C_4 L_4 R_1 R_4 + 2 C_1 L_1 L_4 R_1 g_m + 2 C_1 L_1 L_4) + s^2 (2 C_1 L_1 R_1 R_4 g_m + 2 C_1 L_1 R_4 + 2 C_1 L_4 R_1 + 2 C_4 L_4 R_1 R_4 g_m + 2 C_4 L_4 R_4) + s (2 C_1 R_1 R_4 + 2 L_4 R_1 g_m + 2 L_4)}$$

$$10.89 \quad \text{INVALID-ORDER-89} \quad Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_4 L_1 L_4 R_1 R_4 g_m s^4 + C_1 L_1 L_4 R_1 g_m s^3 + L_4 R_1 g_m s + R_1 R_4 g_m + s^2 (C_1 L_1 R_1 R_4 g_m + C_4 L_4 R_1 R_4 g_m)}{2 C_1 C_4 L_4 R_1 s^3 + 2 C_1 R_1 s + 2 R_1 g_m + s^4 (2 C_1 C_4 L_1 L_4 R_1 g_m + 2 C_1 C_4 L_1 L_4) + s^2 (2 C_1 L_1 R_1 g_m + 2 C_1 L_1 + 2 C_4 L_4 R_1 g_m + 2 C_4 L_4) + 2}$$

10.90 INVALID-ORDER-90

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

$$H(s) = \frac{C_1C_4L_1L_4R_1R_4g_ms^4 + R_1R_4g_m + s^2\left(C_1L_1R_1R_4g_m + C_4L_4R_1R_4g_m\right)}{2R_1g_m + s^4\left(2C_1C_4L_1L_4R_1g_m + 2C_1C_4L_1L_4\right) + s^3\left(2C_1C_4L_1R_1R_4g_m + 2C_1C_4L_1R_4 + 2C_1C_4L_4R_1\right) + s^2\left(2C_1C_4R_1R_4 + 2C_1L_1R_1g_m + 2C_1L_1 + 2C_4L_4R_1g_m + 2C_4L_4\right) + s\left(2C_1R_1 + 2C_4R_1R_4g_m + 2C_4R_4\right) + 2}$$

11 PolynomialError