

Filter Summary Report: TIA,simple,Z3,Z5

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10.44INVALID-ORDER-44	$Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$	15

10.82INVALID-ORDER-82	$Z(s) = \left(\infty, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \frac{L_5s}{C_5L_5s^2+1} + R_5, \infty \right)$	19
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1 Examined $H(z)$ for TIA simple Z3 Z5: $\frac{Z_3(Z_5g_m-1)}{2Z_3g_m+Z_5g_m+1}$

$$H(z) = \frac{Z_3 (Z_5g_m - 1)}{2Z_3g_m + Z_5g_m + 1}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, R_5, \infty \right)$

$$H(s) = \frac{s (L_3R_5g_m - L_3)}{2L_3g_ms + R_5g_m + s^2 (C_3L_3R_5g_m + C_3L_3) + 1}$$

Parameters:

Q: $\frac{C_3\sqrt{\frac{1}{C_3L_3}}(R_5g_m+1)}{2g_m}$
 wo: $\sqrt{\frac{1}{C_3L_3}}$
 bandwidth: $\frac{2g_m}{C_3(R_5g_m+1)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_5g_m-1}{2g_m}$
 Qz: 0
 Wz: None

3.2 BP-2 $Z(s) = \left(\infty, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, R_5, \infty \right)$

$$H(s) = \frac{s (L_3R_3R_5g_m - L_3R_3)}{R_3R_5g_m + R_3 + s^2 (C_3L_3R_3R_5g_m + C_3L_3R_3) + s (2L_3R_3g_m + L_3R_5g_m + L_3)}$$

Parameters:

Q: $\frac{C_3R_3\sqrt{\frac{1}{C_3L_3}}(R_5g_m+1)}{2R_3g_m+R_5g_m+1}$
 wo: $\sqrt{\frac{1}{C_3L_3}}$
 bandwidth: $\frac{2R_3g_m+R_5g_m+1}{C_3R_3(R_5g_m+1)}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_3(R_5g_m-1)}{2R_3g_m+R_5g_m+1}$
 Qz: 0
 Wz: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, R_5, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{2L_3 g_m \sqrt{\frac{1}{C_3 L_3}}}{R_5 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\ \text{bandwidth: } & \frac{R_5 g_m + 1}{2L_3 g_m} \\ \text{K-LP: } & \frac{R_5 g_m - 1}{2g_m} \\ \text{K-HP: } & \frac{R_5 g_m - 1}{2g_m} \\ \text{K-BP: } & 0 \\ \text{Qz: } & \text{None} \\ \text{Wz: } & \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

5.2 BS-2 $Z(s) = \left(\infty, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, R_5, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{L_3 \sqrt{\frac{1}{C_3 L_3}} (2R_3 g_m + R_5 g_m + 1)}{R_3 (R_5 g_m + 1)} \\ \text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\ \text{bandwidth: } & \frac{R_3 (R_5 g_m + 1)}{L_3 (2R_3 g_m + R_5 g_m + 1)} \\ \text{K-LP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-HP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-BP: } & 0 \\ \text{Qz: } & \text{None} \\ \text{Wz: } & \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

6 GE

6.1 GE-1 $Z(s) = \left(\infty, \infty, R_3, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{L_5 g_m \sqrt{\frac{1}{C_5 L_5}}}{2R_3 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{2R_3 g_m + 1}{L_5 g_m} \\ \text{K-LP: } & R_3 \\ \text{K-HP: } & R_3 \\ \text{K-BP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{Qz: } & -L_5 g_m \sqrt{\frac{1}{C_5 L_5}} \\ \text{Wz: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

$$H(s) = \frac{R_5 g_m + s^2 (C_3 L_3 R_5 g_m - C_3 L_3) - 1}{2C_3 L_3 g_m s^2 + 2g_m + s (C_3 R_5 g_m + C_3)}$$

$$H(s) = \frac{R_3 R_5 g_m - R_3 + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3)}{2R_3 g_m + R_5 g_m + s^2 (2C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3) + s (C_3 R_3 R_5 g_m + C_3 R_3) + 1}$$

$$H(s) = \frac{C_5 L_5 R_3 g_m s^2 - C_5 R_3 s + R_3 g_m}{C_5 L_5 g_m s^2 + g_m + s (2C_5 R_3 g_m + C_5)}$$

6.2 GE-2 $Z(s) = \left(\infty, \infty, R_3, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$

$$H(s) = \frac{-C_5 L_5 R_3 s^2 + L_5 R_3 g_m s - R_3}{L_5 g_m s + 2R_3 g_m + s^2 (2C_5 L_5 R_3 g_m + C_5 L_5) + 1}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_5 \sqrt{\frac{1}{C_5 L_5}} (2R_3 g_m + 1)}{g_m} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{g_m}{C_5 (2R_3 g_m + 1)} \\ \text{K-LP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{K-HP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{K-BP: } & R_3 \\ \text{QZ: } & -\frac{C_5 \sqrt{\frac{1}{C_5 L_5}}}{g_m} \\ \text{WZ: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

6.3 GE-3 $Z(s) = \left(\infty, \infty, R_3, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_5 L_5 R_3 g_m s^2 + R_3 g_m + s (C_5 R_3 R_5 g_m - C_5 R_3)}{C_5 L_5 g_m s^2 + g_m + s (2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{L_5 g_m \sqrt{\frac{1}{C_5 L_5}}}{2R_3 g_m + R_5 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{2R_3 g_m + R_5 g_m + 1}{L_5 g_m} \\ \text{K-LP: } & R_3 \\ \text{K-HP: } & R_3 \\ \text{K-BP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{QZ: } & \frac{L_5 g_m \sqrt{\frac{1}{C_5 L_5}}}{R_5 g_m - 1} \\ \text{WZ: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

6.4 GE-4 $Z(s) = \left(\infty, \infty, R_3, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$

$$H(s) = \frac{-C_5 L_5 R_3 R_5 s^2 - R_3 R_5 + s (L_5 R_3 R_5 g_m - L_5 R_3)}{2R_3 R_5 g_m + R_5 + s^2 (2C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_5) + s (2L_5 R_3 g_m + L_5 R_5 g_m + L_5)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_5 R_5 \sqrt{\frac{1}{C_5 L_5}} (2R_3 g_m + 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{2R_3 g_m + R_5 g_m + 1}{C_5 R_5 (2R_3 g_m + 1)} \\ \text{K-LP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{K-HP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{K-BP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{QZ: } & -\frac{C_5 R_5 \sqrt{\frac{1}{C_5 L_5}}}{R_5 g_m - 1} \\ \text{WZ: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

6.5 GE-5 $Z(s) = \left(\infty, \infty, R_3, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_5 \sqrt{\frac{1}{C_5 L_5}} (2R_3 g_m + R_5 g_m + 1)}{g_m} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{g_m}{C_5 (2R_3 g_m + R_5 g_m + 1)} \\ \text{K-LP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-HP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-BP: } & R_3 \\ \text{QZ: } & \frac{C_5 \sqrt{\frac{1}{C_5 L_5}} (R_5 g_m - 1)}{g_m} \\ \text{Wz: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

6.6 GE-6 $Z(s) = \left(\infty, \infty, R_3, \infty, \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{L_5 \sqrt{\frac{1}{C_5 L_5}} (2R_3 g_m + R_5 g_m + 1)}{R_5 (2R_3 g_m + 1)} \\ \text{wo: } & \sqrt{\frac{1}{C_5 L_5}} \\ \text{bandwidth: } & \frac{R_5 (2R_3 g_m + 1)}{L_5 (2R_3 g_m + R_5 g_m + 1)} \\ \text{K-LP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-HP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-BP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{QZ: } & \frac{L_5 \sqrt{\frac{1}{C_5 L_5}} (-R_5 g_m + 1)}{R_5} \\ \text{Wz: } & \sqrt{\frac{1}{C_5 L_5}} \end{aligned}$$

6.7 GE-7 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, R_5, \infty \right)$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{2L_3 g_m \sqrt{\frac{1}{C_3 L_3}}}{2R_3 g_m + R_5 g_m + 1} \\ \text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\ \text{bandwidth: } & \frac{2R_3 g_m + R_5 g_m + 1}{2L_3 g_m} \\ \text{K-LP: } & \frac{R_5 g_m - 1}{2g_m} \\ \text{K-HP: } & \frac{R_5 g_m - 1}{2g_m} \\ \text{K-BP: } & \frac{R_3 (R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{QZ: } & \frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3} \\ \text{Wz: } & \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

$$H(s) = \frac{L_5 R_3 g_m s + R_3 R_5 g_m - R_3 + s^2 (C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3)}{L_5 g_m s + 2R_3 g_m + R_5 g_m + s^2 (2C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + 1}$$

$$H(s) = \frac{-C_5 R_3 R_5 s + R_3 R_5 g_m - R_3 + s^2 (C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3)}{2R_3 g_m + R_5 g_m + s^2 (2C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (2C_5 R_3 R_5 g_m + C_5 R_5) + 1}$$

$$H(s) = \frac{R_5 g_m + s^2 (C_3 L_3 R_5 g_m - C_3 L_3) + s (C_3 R_3 R_5 g_m - C_3 R_3) - 1}{2C_3 L_3 g_m s^2 + 2g_m + s (2C_3 R_3 g_m + C_3 R_5 g_m + C_3)}$$

6.8 GE-8 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, R_5, \infty \right)$

$$H(s) = \frac{R_3 R_5 g_m - R_3 + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3) + s (L_3 R_5 g_m - L_3)}{2 L_3 g_m s + 2 R_3 g_m + R_5 g_m + s^2 (2 C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3) + 1}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_3 \sqrt{\frac{1}{C_3 L_3}} (2 R_3 g_m + R_5 g_m + 1)}{2 g_m} \\ \text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\ \text{bandwidth: } & \frac{2 g_m}{C_3 (2 R_3 g_m + R_5 g_m + 1)} \\ \text{K-LP: } & \frac{R_3 (R_5 g_m - 1)}{2 R_3 g_m + R_5 g_m + 1} \\ \text{K-HP: } & \frac{R_3 (R_5 g_m - 1)}{2 R_3 g_m + R_5 g_m + 1} \\ \text{K-BP: } & \frac{R_5 g_m - 1}{2 g_m} \\ \text{Qz: } & C_3 R_3 \sqrt{\frac{1}{C_3 L_3}} \\ \text{Wz: } & \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_5 R_5 s + R_5 g_m - 1}{C_3 C_5 R_5 s^2 + 2 g_m + s (C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{\sqrt{2} C_3 C_5 R_5 \sqrt{\frac{g_m}{C_3 C_5 R_5}}}{C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m} \\ \text{wo: } & \sqrt{2} \sqrt{\frac{g_m}{C_3 C_5 R_5}} \\ \text{bandwidth: } & \frac{C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m}{C_3 C_5 R_5} \\ \text{K-LP: } & \frac{R_5 g_m - 1}{2 g_m} \\ \text{K-HP: } & 0 \\ \text{K-BP: } & -\frac{C_5 R_5}{C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m} \\ \text{Qz: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

8.2 INVALID-NUMER-2 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{-C_5 R_3 s + R_3 g_m}{C_3 C_5 R_3 s^2 + g_m + s (C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_3 C_5 R_3 \sqrt{\frac{g_m}{C_3 C_5 R_3}}}{C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5} \\ \text{wo: } & \sqrt{\frac{g_m}{C_3 C_5 R_3}} \\ \text{bandwidth: } & \frac{C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5}{C_3 C_5 R_3} \\ \text{K-LP: } & R_3 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & -\frac{C_5 R_3}{C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5} \\ \text{Qz: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

8.3 INVALID-NUMER-3 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_5 R_3 R_5 s + R_3 R_5 g_m - R_3}{C_3 C_5 R_3 R_5 s^2 + 2R_3 g_m + R_5 g_m + s(C_3 R_3 R_5 g_m + C_3 R_3 + 2C_5 R_3 R_5 g_m + C_5 R_5) + 1}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_3 C_5 R_3 R_5 \sqrt{\frac{2R_3 g_m + R_5 g_m + 1}{C_3 C_5 R_3 R_5}}}{C_3 R_3 R_5 g_m + C_3 R_3 + 2C_5 R_3 R_5 g_m + C_5 R_5} \\ \text{wo: } & \sqrt{\frac{2R_3 g_m + R_5 g_m + 1}{C_3 C_5 R_3 R_5}} \\ \text{bandwidth: } & \frac{C_3 R_3 R_5 g_m + C_3 R_3 + 2C_5 R_3 R_5 g_m + C_5 R_5}{C_3 C_5 R_3 R_5} \\ \text{K-LP: } & \frac{R_3(R_5 g_m - 1)}{2R_3 g_m + R_5 g_m + 1} \\ \text{K-HP: } & 0 \\ \text{K-BP: } & -\frac{C_5 R_3 R_5}{C_3 R_3 R_5 g_m + C_3 R_3 + 2C_5 R_3 R_5 g_m + C_5 R_5} \\ \text{QZ: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

8.4 INVALID-NUMER-4 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{R_3 g_m + s(C_5 R_3 R_5 g_m - C_5 R_3)}{g_m + s^2(C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_3) + s(C_3 R_3 g_m + 2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{C_3 C_5 R_3 \sqrt{\frac{g_m}{C_3 C_5 R_3 (R_5 g_m + 1)}} (R_5 g_m + 1)}{C_3 R_3 g_m + 2C_5 R_3 g_m + C_5 R_5 g_m + C_5} \\ \text{wo: } & \sqrt{\frac{g_m}{C_3 C_5 R_3 (R_5 g_m + 1)}} \\ \text{bandwidth: } & \frac{C_3 R_3 g_m + 2C_5 R_3 g_m + C_5 R_5 g_m + C_5}{C_3 C_5 R_3 (R_5 g_m + 1)} \\ \text{K-LP: } & R_3 \\ \text{K-HP: } & 0 \\ \text{K-BP: } & \frac{C_5 R_3 (R_5 g_m - 1)}{C_3 R_3 g_m + 2C_5 R_3 g_m + C_5 R_5 g_m + C_5} \\ \text{QZ: } & 0 \\ \text{Wz: } & \text{None} \end{aligned}$$

9 INVALID-WZ

9.1 INVALID-WZ-1 $Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 R_3 R_5 s^2 + R_5 g_m + s(C_3 R_3 R_5 g_m - C_3 R_3 - C_5 R_5) - 1}{2g_m + s^2(2C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_5) + s(2C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m)}$$

Parameters:

$$\begin{aligned} \text{Q: } & \frac{\sqrt{2} C_3 C_5 R_5 \sqrt{\frac{g_m}{C_3 C_5 R_5 (2R_3 g_m + 1)}} (2R_3 g_m + 1)}{2C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m} \\ \text{wo: } & \sqrt{2} \sqrt{\frac{g_m}{C_3 C_5 R_5 (2R_3 g_m + 1)}} \\ \text{bandwidth: } & \frac{2C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m}{C_3 C_5 R_5 (2R_3 g_m + 1)} \\ \text{K-LP: } & \frac{R_5 g_m - 1}{2g_m} \\ \text{K-HP: } & -\frac{R_3}{2R_3 g_m + 1} \\ \text{K-BP: } & \frac{C_3 R_3 R_5 g_m - C_3 R_3 - C_5 R_5}{2C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m} \\ \text{QZ: } & \frac{\sqrt{2} C_3 C_5 R_3 R_5 \sqrt{\frac{g_m}{C_3 C_5 R_5 (2R_3 g_m + 1)}}}{-C_3 R_3 R_5 g_m + C_3 R_3 + C_5 R_5} \\ \text{Wz: } & \sqrt{\frac{-R_5 g_m + 1}{C_3 C_5 R_3 R_5}} \end{aligned}$$

10 INVALID-ORDER

$$10.1 \quad \text{INVALID-ORDER-1} \quad Z(s) = (\infty, \infty, R_3, \infty, R_5, \infty)$$

$$H(s) = \frac{R_3 R_5 g_m - R_3}{2R_3 g_m + R_5 g_m + 1}$$

$$10.2 \quad \text{INVALID-ORDER-2} \quad Z(s) = \left(\infty, \infty, R_3, \infty, \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{-C_5 R_3 s + R_3 g_m}{g_m + s(2C_5 R_3 g_m + C_5)}$$

$$10.3 \quad \text{INVALID-ORDER-3} \quad Z(s) = \left(\infty, \infty, R_3, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 R_3 R_5 s + R_3 R_5 g_m - R_3}{2R_3 g_m + R_5 g_m + s(2C_5 R_3 R_5 g_m + C_5 R_5) + 1}$$

$$10.4 \quad \text{INVALID-ORDER-4} \quad Z(s) = \left(\infty, \infty, R_3, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{R_3 g_m + s(C_5 R_3 R_5 g_m - C_5 R_3)}{g_m + s(2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

$$10.5 \quad \text{INVALID-ORDER-5} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, R_5, \infty \right)$$

$$H(s) = \frac{R_5 g_m - 1}{2g_m + s(C_3 R_5 g_m + C_3)}$$

$$10.6 \quad \text{INVALID-ORDER-6} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{-C_5 s + g_m}{C_3 C_5 s^2 + s(C_3 g_m + 2C_5 g_m)}$$

$$10.7 \quad \text{INVALID-ORDER-7} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{g_m + s(C_5 R_5 g_m - C_5)}{s^2(C_3 C_5 R_5 g_m + C_3 C_5) + s(C_3 g_m + 2C_5 g_m)}$$

$$10.8 \quad \text{INVALID-ORDER-8} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_5 L_5 g_m s^2 - C_5 s + g_m}{C_3 C_5 L_5 g_m s^3 + C_3 C_5 s^2 + s(C_3 g_m + 2C_5 g_m)}$$

$$10.9 \quad \text{INVALID-ORDER-9} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 L_5 s^2 + L_5 g_m s - 1}{C_3 C_5 L_5 s^3 + C_3 s + 2g_m + s^2(C_3 L_5 g_m + 2C_5 L_5 g_m)}$$

$$10.10 \quad \text{INVALID-ORDER-10} \quad Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_5 L_5 g_m s^2 + g_m + s(C_5 R_5 g_m - C_5)}{C_3 C_5 L_5 g_m s^3 + s^2(C_3 C_5 R_5 g_m + C_3 C_5) + s(C_3 g_m + 2C_5 g_m)}$$

10.11 INVALID-ORDER-11 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$

$$H(s) = \frac{-C_5 L_5 R_5 s^2 - R_5 + s (L_5 R_5 g_m - L_5)}{C_3 C_5 L_5 R_5 s^3 + 2R_5 g_m + s^2 (C_3 L_5 R_5 g_m + C_3 L_5 + 2C_5 L_5 R_5 g_m) + s (C_3 R_5 + 2L_5 g_m)}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$

$$H(s) = \frac{L_5 g_m s + R_5 g_m + s^2 (C_5 L_5 R_5 g_m - C_5 L_5) - 1}{2g_m + s^3 (C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (C_3 L_5 g_m + 2C_5 L_5 g_m) + s (C_3 R_5 g_m + C_3)}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(\infty, \infty, \frac{1}{C_3 s}, \infty, \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_5 R_5 s + R_5 g_m + s^2 (C_5 L_5 R_5 g_m - C_5 L_5) - 1}{2g_m + s^3 (C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (C_3 C_5 R_5 + 2C_5 L_5 g_m) + s (C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m)}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, R_5, \infty \right)$

$$H(s) = \frac{R_3 R_5 g_m - R_3}{2R_3 g_m + R_5 g_m + s (C_3 R_3 R_5 g_m + C_3 R_3) + 1}$$

10.15 INVALID-ORDER-15 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_5 L_5 R_3 g_m s^2 - C_5 R_3 s + R_3 g_m}{C_3 C_5 L_5 R_3 g_m s^3 + g_m + s^2 (C_3 C_5 R_3 + C_5 L_5 g_m) + s (C_3 R_3 g_m + 2C_5 R_3 g_m + C_5)}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$

$$H(s) = \frac{-C_5 L_5 R_3 s^2 + L_5 R_3 g_m s - R_3}{C_3 C_5 L_5 R_3 s^3 + 2R_3 g_m + s^2 (C_3 L_5 R_3 g_m + 2C_5 L_5 R_3 g_m + C_5 L_5) + s (C_3 R_3 + L_5 g_m) + 1}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_5 L_5 R_3 g_m s^2 + R_3 g_m + s (C_5 R_3 R_5 g_m - C_5 R_3)}{C_3 C_5 L_5 R_3 g_m s^3 + g_m + s^2 (C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_3 + C_5 L_5 g_m) + s (C_3 R_3 g_m + 2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$

$$H(s) = \frac{-C_5 L_5 R_3 R_5 s^2 - R_3 R_5 + s (L_5 R_3 R_5 g_m - L_5 R_3)}{C_3 C_5 L_5 R_3 R_5 s^3 + 2R_3 R_5 g_m + R_5 + s^2 (C_3 L_5 R_3 R_5 g_m + C_3 L_5 R_3 + 2C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_5) + s (C_3 R_3 R_5 + 2L_5 R_3 g_m + L_5 R_5 g_m + L_5)}$$

10.19 INVALID-ORDER-19 $Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$

$$H(s) = \frac{L_5 R_3 g_m s + R_3 R_5 g_m - R_3 + s^2 (C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3)}{2R_3 g_m + R_5 g_m + s^3 (C_3 C_5 L_5 R_3 R_5 g_m + C_3 C_5 L_5 R_3) + s^2 (C_3 L_5 R_3 g_m + 2C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (C_3 R_3 R_5 g_m + C_3 R_3 + L_5 g_m) + 1}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left(\infty, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 R_3 R_5 s + R_3 R_5 g_m - R_3 + s^2 (C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3)}{2R_3 g_m + R_5 g_m + s^3 (C_3 C_5 L_5 R_3 R_5 g_m + C_3 C_5 L_5 R_3) + s^2 (C_3 C_5 R_3 R_5 + 2C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (C_3 R_3 R_5 g_m + C_3 R_3 + 2C_5 R_3 R_5 g_m + C_5 R_5) + 1}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, R_5, \infty \right)$$

$$H(s) = \frac{R_5 g_m + s (C_3 R_3 R_5 g_m - C_3 R_3) - 1}{2g_m + s (2C_3 R_3 g_m + C_3 R_5 g_m + C_3)}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 R_3 s^2 + g_m + s (C_3 R_3 g_m - C_5)}{s^2 (2C_3 C_5 R_3 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{g_m + s^2 (C_3 C_5 R_3 R_5 g_m - C_3 C_5 R_3) + s (C_3 R_3 g_m + C_5 R_5 g_m - C_5)}{s^2 (2C_3 C_5 R_3 g_m + C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_5 R_3 g_m s^3 + g_m + s^2 (-C_3 C_5 R_3 + C_5 L_5 g_m) + s (C_3 R_3 g_m - C_5)}{C_3 C_5 L_5 g_m s^3 + s^2 (2C_3 C_5 R_3 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_5 R_3 s^3 + s^2 (C_3 L_5 R_3 g_m - C_5 L_5) + s (-C_3 R_3 + L_5 g_m) - 1}{2g_m + s^3 (2C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5) + s^2 (C_3 L_5 g_m + 2C_5 L_5 g_m) + s (2C_3 R_3 g_m + C_3)}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_5 R_3 g_m s^3 + g_m + s^2 (C_3 C_5 R_3 R_5 g_m - C_3 C_5 R_3 + C_5 L_5 g_m) + s (C_3 R_3 g_m + C_5 R_5 g_m - C_5)}{C_3 C_5 L_5 g_m s^3 + s^2 (2C_3 C_5 R_3 g_m + C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_5 R_3 R_5 s^3 - R_5 + s^2 (C_3 L_5 R_3 R_5 g_m - C_3 L_5 R_3 - C_5 L_5 R_5) + s (-C_3 R_3 R_5 + L_5 R_5 g_m - L_5)}{2R_5 g_m + s^3 (2C_3 C_5 L_5 R_3 R_5 g_m + C_3 C_5 L_5 R_5) + s^2 (2C_3 L_5 R_3 g_m + C_3 L_5 R_5 g_m + C_3 L_5 + 2C_5 L_5 R_5 g_m) + s (2C_3 R_3 R_5 g_m + C_3 R_5 + 2L_5 g_m)}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$$

$$H(s) = \frac{R_5 g_m + s^3 (C_3 C_5 L_5 R_3 R_5 g_m - C_3 C_5 L_5 R_3) + s^2 (C_3 L_5 R_3 g_m + C_5 L_5 R_5 g_m - C_5 L_5) + s (C_3 R_3 R_5 g_m - C_3 R_3 + L_5 g_m) - 1}{2g_m + s^3 (2C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (C_3 L_5 g_m + 2C_5 L_5 g_m) + s (2C_3 R_3 g_m + C_3 R_5 g_m + C_3)}$$

10.29 INVALID-ORDER-29 $Z(s) = \left(\infty, \infty, R_3 + \frac{1}{C_3 s}, \infty, \frac{R_5(C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{R_5 g_m + s^3 (C_3 C_5 L_5 R_3 R_5 g_m - C_3 C_5 L_5 R_3) + s^2 (-C_3 C_5 R_3 R_5 + C_5 L_5 R_5 g_m - C_5 L_5) + s (C_3 R_3 R_5 g_m - C_3 R_3 - C_5 R_5) - 1}{2g_m + s^3 (2C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (2C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_5 + 2C_5 L_5 g_m) + s (2C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m)}$$

10.30 INVALID-ORDER-30 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 s^3 + C_3 L_3 g_m s^2 - C_5 s + g_m}{2C_3 C_5 L_3 g_m s^3 + C_3 C_5 s^2 + s (C_3 g_m + 2C_5 g_m)}$$

10.31 INVALID-ORDER-31 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 R_5 s^3 - C_5 R_5 s + R_5 g_m + s^2 (C_3 L_3 R_5 g_m - C_3 L_3) - 1}{2C_3 C_5 L_3 R_5 g_m s^3 + 2g_m + s^2 (C_3 C_5 R_5 + 2C_3 L_3 g_m) + s (C_3 R_5 g_m + C_3 + 2C_5 R_5 g_m)}$$

10.32 INVALID-ORDER-32 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_3 L_3 g_m s^2 + g_m + s^3 (C_3 C_5 L_3 R_5 g_m - C_3 C_5 L_3) + s (C_5 R_5 g_m - C_5)}{2C_3 C_5 L_3 g_m s^3 + s^2 (C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

10.33 INVALID-ORDER-33 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_3 C_5 L_3 L_5 g_m s^4 - C_3 C_5 L_3 s^3 - C_5 s + g_m + s^2 (C_3 L_3 g_m + C_5 L_5 g_m)}{C_3 C_5 s^2 + s^3 (2C_3 C_5 L_3 g_m + C_3 C_5 L_5 g_m) + s (C_3 g_m + 2C_5 g_m)}$$

10.34 INVALID-ORDER-34 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 s^4 + C_3 L_3 L_5 g_m s^3 + L_5 g_m s + s^2 (-C_3 L_3 - C_5 L_5) - 1}{2C_3 C_5 L_3 L_5 g_m s^4 + C_3 C_5 L_5 s^3 + C_3 s + 2g_m + s^2 (2C_3 L_3 g_m + C_3 L_5 g_m + 2C_5 L_5 g_m)}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (C_3 C_5 L_3 R_5 g_m - C_3 C_5 L_3) + s^2 (C_3 L_3 g_m + C_5 L_5 g_m) + s (C_5 R_5 g_m - C_5)}{s^3 (2C_3 C_5 L_3 g_m + C_3 C_5 L_5 g_m) + s^2 (C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2C_5 g_m)}$$

10.36 INVALID-ORDER-36 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_5 s^4 - R_5 + s^3 (C_3 L_3 L_5 R_5 g_m - C_3 L_3 L_5) + s^2 (-C_3 L_3 R_5 - C_5 L_5 R_5) + s (L_5 R_5 g_m - L_5)}{2C_3 C_5 L_3 L_5 R_5 g_m s^4 + 2R_5 g_m + s^3 (C_3 C_5 L_5 R_5 + 2C_3 L_3 L_5 g_m) + s^2 (2C_3 L_3 R_5 g_m + C_3 L_5 R_5 g_m + C_3 L_5 + 2C_5 L_5 R_5 g_m) + s (C_3 R_5 + 2L_5 g_m)}$$

10.37 INVALID-ORDER-37 $Z(s) = \left(\infty, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$

$$H(s) = \frac{C_3 L_3 L_5 g_m s^3 + L_5 g_m s + R_5 g_m + s^4 (C_3 C_5 L_3 L_5 R_5 g_m - C_3 C_5 L_3 L_5) + s^2 (C_3 L_3 R_5 g_m - C_3 L_3 + C_5 L_5 R_5 g_m - C_5 L_5) - 1}{2C_3 C_5 L_3 L_5 g_m s^4 + 2g_m + s^3 (C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (2C_3 L_3 g_m + C_3 L_5 g_m + 2C_5 L_5 g_m) + s (C_3 R_5 g_m + C_3)}$$

10.38 INVALID-ORDER-38 $Z(s) = \left(\infty, \infty, L_3s + \frac{1}{C_3s}, \infty, \frac{R_5(C_5L_5s^2+1)}{C_5L_5s^2+C_5R_5s+1}, \infty \right)$

$$H(s) = \frac{-C_3C_5L_3R_5s^3 - C_5R_5s + R_5g_m + s^4(C_3C_5L_3L_5R_5g_m - C_3C_5L_3L_5) + s^2(C_3L_3R_5g_m - C_3L_3 + C_5L_5R_5g_m - C_5L_5) - 1}{2C_3C_5L_3L_5g_ms^4 + 2g_m + s^3(2C_3C_5L_3R_5g_m + C_3C_5L_5R_5g_m + C_3C_5L_5) + s^2(C_3C_5R_5 + 2C_3L_3g_m + 2C_5L_5g_m) + s(C_3R_5g_m + C_3 + 2C_5R_5g_m)}$$

10.39 INVALID-ORDER-39 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \frac{1}{C_5s}, \infty \right)$

$$H(s) = \frac{-C_5L_3s^2 + L_3g_ms}{C_3C_5L_3s^3 + C_5s + g_m + s^2(C_3L_3g_m + 2C_5L_3g_m)}$$

10.40 INVALID-ORDER-40 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \frac{R_5}{C_5R_5s+1}, \infty \right)$

$$H(s) = \frac{-C_5L_3R_5s^2 + s(L_3R_5g_m - L_3)}{C_3C_5L_3R_5s^3 + R_5g_m + s^2(C_3L_3R_5g_m + C_3L_3 + 2C_5L_3R_5g_m) + s(C_5R_5 + 2L_3g_m) + 1}$$

10.41 INVALID-ORDER-41 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, R_5 + \frac{1}{C_5s}, \infty \right)$

$$H(s) = \frac{L_3g_ms + s^2(C_5L_3R_5g_m - C_5L_3)}{g_m + s^3(C_3C_5L_3R_5g_m + C_3C_5L_3) + s^2(C_3L_3g_m + 2C_5L_3g_m) + s(C_5R_5g_m + C_5)}$$

10.42 INVALID-ORDER-42 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, L_5s + \frac{1}{C_5s}, \infty \right)$

$$H(s) = \frac{C_5L_3L_5g_ms^3 - C_5L_3s^2 + L_3g_ms}{C_3C_5L_3L_5g_ms^4 + C_3C_5L_3s^3 + C_5s + g_m + s^2(C_3L_3g_m + 2C_5L_3g_m + C_5L_5g_m)}$$

10.43 INVALID-ORDER-43 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \frac{L_5s}{C_5L_5s^2+1}, \infty \right)$

$$H(s) = \frac{-C_5L_3L_5s^3 + L_3L_5g_ms^2 - L_3s}{C_3C_5L_3L_5s^4 + s^3(C_3L_3L_5g_m + 2C_5L_3L_5g_m) + s^2(C_3L_3 + C_5L_5) + s(2L_3g_m + L_5g_m) + 1}$$

10.44 INVALID-ORDER-44 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, L_5s + R_5 + \frac{1}{C_5s}, \infty \right)$

$$H(s) = \frac{C_5L_3L_5g_ms^3 + L_3g_ms + s^2(C_5L_3R_5g_m - C_5L_3)}{C_3C_5L_3L_5g_ms^4 + g_m + s^3(C_3C_5L_3R_5g_m + C_3C_5L_3) + s^2(C_3L_3g_m + 2C_5L_3g_m + C_5L_5g_m) + s(C_5R_5g_m + C_5)}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \frac{L_5R_5s}{C_5L_5R_5s^2+L_5s+R_5}, \infty \right)$

$$H(s) = \frac{-C_5L_3L_5R_5s^3 - L_3R_5s + s^2(L_3L_5R_5g_m - L_3L_5)}{C_3C_5L_3L_5R_5s^4 + R_5 + s^3(C_3L_3L_5R_5g_m + C_3L_3L_5 + 2C_5L_3L_5R_5g_m) + s^2(C_3L_3R_5 + C_5L_5R_5 + 2L_3L_5g_m) + s(2L_3R_5g_m + L_5R_5g_m + L_5)}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \frac{L_5s}{C_5L_5s^2+1} + R_5, \infty \right)$

$$H(s) = \frac{L_3L_5g_ms^2 + s^3(C_5L_3L_5R_5g_m - C_5L_3L_5) + s(L_3R_5g_m - L_3)}{R_5g_m + s^4(C_3C_5L_3L_5R_5g_m + C_3C_5L_3L_5) + s^3(C_3L_3L_5g_m + 2C_5L_3L_5g_m) + s^2(C_3L_3R_5g_m + C_3L_3 + C_5L_5R_5g_m + C_5L_5) + s(2L_3g_m + L_5g_m) + 1}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_5 L_3 R_5 s^2 + s^3 (C_5 L_3 L_5 R_5 g_m - C_5 L_3 L_5) + s (L_3 R_5 g_m - L_3)}{R_5 g_m + s^4 (C_3 C_5 L_3 L_5 R_5 g_m + C_3 C_5 L_3 L_5) + s^3 (C_3 C_5 L_3 R_5 + 2 C_5 L_3 L_5 g_m) + s^2 (C_3 L_3 R_5 g_m + C_3 L_3 + 2 C_5 L_3 R_5 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (C_5 R_5 + 2 L_3 g_m) + 1}$$

10.48 INVALID-ORDER-48 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 s^3 + g_m + s^2 (-C_3 C_5 R_3 + C_3 L_3 g_m) + s (C_3 R_3 g_m - C_5)}{2 C_3 C_5 L_3 g_m s^3 + s^2 (2 C_3 C_5 R_3 g_m + C_3 C_5) + s (C_3 g_m + 2 C_5 g_m)}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 R_5 s^3 + R_5 g_m + s^2 (-C_3 C_5 R_3 R_5 + C_3 L_3 R_5 g_m - C_3 L_3) + s (C_3 R_3 R_5 g_m - C_3 R_3 - C_5 R_5) - 1}{2 C_3 C_5 L_3 R_5 g_m s^3 + 2 g_m + s^2 (2 C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_5 + 2 C_3 L_3 g_m) + s (2 C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{g_m + s^3 (C_3 C_5 L_3 R_5 g_m - C_3 C_5 L_3) + s^2 (C_3 C_5 R_3 R_5 g_m - C_3 C_5 R_3 + C_3 L_3 g_m) + s (C_3 R_3 g_m + C_5 R_5 g_m - C_5)}{2 C_3 C_5 L_3 g_m s^3 + s^2 (2 C_3 C_5 R_3 g_m + C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2 C_5 g_m)}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (-C_3 C_5 L_3 + C_3 C_5 L_5 R_3 g_m) + s^2 (-C_3 C_5 R_3 + C_3 L_3 g_m + C_5 L_5 g_m) + s (C_3 R_3 g_m - C_5)}{s^3 (2 C_3 C_5 L_3 g_m + C_3 C_5 L_5 g_m) + s^2 (2 C_3 C_5 R_3 g_m + C_3 C_5) + s (C_3 g_m + 2 C_5 g_m)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 s^4 + s^3 (-C_3 C_5 L_5 R_3 + C_3 L_3 L_5 g_m) + s^2 (-C_3 L_3 + C_3 L_5 R_3 g_m - C_5 L_5) + s (-C_3 R_3 + L_5 g_m) - 1}{2 C_3 C_5 L_3 L_5 g_m s^4 + 2 g_m + s^3 (2 C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5) + s^2 (2 C_3 L_3 g_m + C_3 L_5 g_m + 2 C_5 L_5 g_m) + s (2 C_3 R_3 g_m + C_3)}$$

10.53 INVALID-ORDER-53 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$

$$H(s) = \frac{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (C_3 C_5 L_3 R_5 g_m - C_3 C_5 L_3 + C_3 C_5 L_5 R_3 g_m) + s^2 (C_3 C_5 R_3 R_5 g_m - C_3 C_5 R_3 + C_3 L_3 g_m + C_5 L_5 g_m) + s (C_3 R_3 g_m + C_5 R_5 g_m - C_5)}{s^3 (2 C_3 C_5 L_3 g_m + C_3 C_5 L_5 g_m) + s^2 (2 C_3 C_5 R_3 g_m + C_3 C_5 R_5 g_m + C_3 C_5) + s (C_3 g_m + 2 C_5 g_m)}$$

10.54 INVALID-ORDER-54 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_5 s^4 - R_5 + s^3 (-C_3 C_5 L_5 R_3 R_5 + C_3 L_3 L_5 R_5 g_m - C_3 L_3 L_5) + s^2 (-C_3 L_3 R_5 + C_3 L_5 R_3 R_5 g_m - C_3 L_5 R_3 - C_5 L_5 R_5) + s (-C_3 R_3 R_5 + L_5 R_5 g_m - L_5)}{2 C_3 C_5 L_3 L_5 R_5 g_m s^4 + 2 R_5 g_m + s^3 (2 C_3 C_5 L_5 R_3 R_5 g_m + C_3 C_5 L_5 R_5 + 2 C_3 L_3 L_5 g_m) + s^2 (2 C_3 L_3 R_5 g_m + 2 C_3 L_5 R_3 g_m + C_3 L_5 R_5 g_m + C_3 L_5 + 2 C_5 L_5 R_5 g_m) + s (2 C_3 R_3 R_5 g_m + C_3 R_5 + 2 L_5 g_m)}$$

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$

$$H(s) = \frac{R_5 g_m + s^4 (C_3 C_5 L_3 L_5 R_5 g_m - C_3 C_5 L_3 L_5) + s^3 (C_3 C_5 L_5 R_3 R_5 g_m - C_3 C_5 L_5 R_3 + C_3 L_3 L_5 g_m) + s^2 (C_3 L_3 R_5 g_m - C_3 L_3 + C_3 L_5 R_3 g_m + C_5 L_5 R_5 g_m - C_5 L_5) + s (C_3 R_3 R_5 g_m - C_3 R_3 + L_5 g_m) - 1}{2 C_3 C_5 L_3 L_5 g_m s^4 + 2 g_m + s^3 (2 C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (2 C_3 L_3 g_m + C_3 L_5 g_m + 2 C_5 L_5 g_m) + s (2 C_3 R_3 g_m + C_3 R_5 g_m + C_3)}$$

$$10.56 \quad \text{INVALID-ORDER-56} \quad Z(s) = \left(\infty, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \frac{R_5(C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{R_5 g_m + s^4 (C_3 C_5 L_3 L_5 R_5 g_m - C_3 C_5 L_3 L_5) + s^3 (-C_3 C_5 L_3 R_5 + C_3 C_5 L_5 R_3 R_5 g_m - C_3 C_5 L_5 R_3) + s^2 (-C_3 C_5 R_3 R_5 + C_3 L_3 R_5 g_m - C_3 L_3 + C_5 L_5 R_5 g_m - C_5 L_5) + s (C_3 R_3 R_5 g_m - C_3 R_3 - C_5 R_5) - 1}{2 C_3 C_5 L_3 L_5 g_m s^4 + 2 g_m + s^3 (2 C_3 C_5 L_3 R_5 g_m + 2 C_3 C_5 L_5 R_3 g_m + C_3 C_5 L_5 R_5 g_m + C_3 C_5 L_5) + s^2 (2 C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_5 + 2 C_3 L_3 g_m + 2 C_5 L_5 g_m) + s (2 C_3 R_3 g_m + C_3 R_5 g_m + C_3 + 2 C_5 R_5 g_m)}$$

$$10.57 \quad \text{INVALID-ORDER-57} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{-C_5 L_3 R_3 s^2 + L_3 R_3 g_m s}{C_3 C_5 L_3 R_3 s^3 + R_3 g_m + s^2 (C_3 L_3 R_3 g_m + 2 C_5 L_3 R_3 g_m + C_5 L_3) + s (C_5 R_3 + L_3 g_m)}$$

$$10.58 \quad \text{INVALID-ORDER-58} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 L_3 R_3 R_5 s^2 + s (L_3 R_3 R_5 g_m - L_3 R_3)}{C_3 C_5 L_3 R_3 R_5 s^3 + R_3 R_5 g_m + R_3 + s^2 (C_3 L_3 R_3 R_5 g_m + C_3 L_3 R_3 + 2 C_5 L_3 R_3 R_5 g_m + C_5 L_3 R_5) + s (C_5 R_3 R_5 + 2 L_3 R_3 g_m + L_3 R_5 g_m + L_3)}$$

$$10.59 \quad \text{INVALID-ORDER-59} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{L_3 R_3 g_m s + s^2 (C_5 L_3 R_3 R_5 g_m - C_5 L_3 R_3)}{R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m + C_3 C_5 L_3 R_3) + s^2 (C_3 L_3 R_3 g_m + 2 C_5 L_3 R_3 g_m + C_5 L_3 R_5 g_m + C_5 L_3) + s (C_5 R_3 R_5 g_m + C_5 R_3 + L_3 g_m)}$$

$$10.60 \quad \text{INVALID-ORDER-60} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_5 L_3 L_5 R_3 g_m s^3 - C_5 L_3 R_3 s^2 + L_3 R_3 g_m s}{C_3 C_5 L_3 L_5 R_3 g_m s^4 + R_3 g_m + s^3 (C_3 C_5 L_3 R_3 + C_5 L_3 L_5 g_m) + s^2 (C_3 L_3 R_3 g_m + 2 C_5 L_3 R_3 g_m + C_5 L_3 + C_5 L_5 R_3 g_m) + s (C_5 R_3 + L_3 g_m)}$$

$$10.61 \quad \text{INVALID-ORDER-61} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 L_3 L_5 R_3 s^3 + L_3 L_5 R_3 g_m s^2 - L_3 R_3 s}{C_3 C_5 L_3 L_5 R_3 s^4 + R_3 + s^3 (C_3 L_3 L_5 R_3 g_m + 2 C_5 L_3 L_5 R_3 g_m + C_5 L_3 L_5) + s^2 (C_3 L_3 R_3 + C_5 L_5 R_3 + L_3 L_5 g_m) + s (2 L_3 R_3 g_m + L_3 + L_5 R_3 g_m)}$$

$$10.62 \quad \text{INVALID-ORDER-62} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_5 L_3 L_5 R_3 g_m s^3 + L_3 R_3 g_m s + s^2 (C_5 L_3 R_3 R_5 g_m - C_5 L_3 R_3)}{C_3 C_5 L_3 L_5 R_3 g_m s^4 + R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m + C_3 C_5 L_3 R_3 + C_5 L_3 L_5 g_m) + s^2 (C_3 L_3 R_3 g_m + 2 C_5 L_3 R_3 g_m + C_5 L_3 R_5 g_m + C_5 L_3 + C_5 L_5 R_3 g_m) + s (C_5 R_3 R_5 g_m + C_5 R_3 + L_3 g_m)}$$

$$10.63 \quad \text{INVALID-ORDER-63} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$$

$$H(s) = \frac{-C_5 L_3 L_5 R_3 R_5 s^3 - L_3 R_3 R_5 s + s^2 (L_3 L_5 R_3 R_5 g_m - L_3 L_5 R_3)}{C_3 C_5 L_3 L_5 R_3 R_5 s^4 + R_3 R_5 + s^3 (C_3 L_3 L_5 R_3 R_5 g_m + C_3 L_3 L_5 R_3 + 2 C_5 L_3 L_5 R_3 R_5 g_m + C_5 L_3 L_5 R_5) + s^2 (C_3 L_3 R_3 R_5 + C_5 L_5 R_3 R_5 + 2 L_3 L_5 R_3 g_m + L_3 L_5 R_5 g_m + L_3 L_5) + s (2 L_3 R_3 R_5 g_m + L_3 R_5 + L_5 R_3 R_5 g_m + L_5 R_3)}$$

$$10.64 \quad \text{INVALID-ORDER-64} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$$

$$H(s) = \frac{L_3 L_5 R_3 g_m s^2 + s^3 (C_5 L_3 L_5 R_3 R_5 g_m - C_5 L_3 L_5 R_3) + s (L_3 R_3 R_5 g_m - L_3 R_3)}{R_3 R_5 g_m + R_3 + s^4 (C_3 C_5 L_3 L_5 R_3 R_5 g_m + C_3 C_5 L_3 L_5 R_3) + s^3 (C_3 L_3 L_5 R_3 g_m + 2 C_5 L_3 L_5 R_3 g_m + C_5 L_3 L_5 R_5 g_m + C_5 L_3 L_5) + s^2 (C_3 L_3 R_3 R_5 g_m + C_3 L_3 R_3 + C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_3 + L_3 L_5 g_m) + s (2 L_3 R_3 g_m + L_3 R_5 g_m + L_3 + L_5 R_3 g_m)}$$

$$10.65 \quad \text{INVALID-ORDER-65} \quad Z(s) = \left(\infty, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{-C_5 L_3 R_3 R_5 s^2 + s^3 (C_5 L_3 L_5 R_3 R_5 g_m - C_5 L_3 L_5 R_3) + s (L_3 R_3 R_5 g_m - L_3 R_3)}{R_3 R_5 g_m + R_3 + s^4 (C_3 C_5 L_3 L_5 R_3 R_5 g_m + C_3 C_5 L_3 L_5 R_3) + s^3 (C_3 C_5 L_3 R_3 R_5 + 2C_5 L_3 L_5 R_3 g_m + C_5 L_3 L_5 R_5 g_m + C_5 L_3 L_5) + s^2 (C_3 L_3 R_3 R_5 g_m + C_3 L_3 R_3 + 2C_5 L_3 R_3 R_5 g_m + C_5 L_3 R_5 + C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_3) + s (C_5 R_3 R_5 + 2L_3 R_3 g_m + L_3 R_5 g_m + L_3)}$$

$$10.66 \quad \text{INVALID-ORDER-66} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 R_3 s^3 + R_3 g_m + s^2 (C_3 L_3 R_3 g_m - C_5 L_3) + s (-C_5 R_3 + L_3 g_m)}{g_m + s^3 (2C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3) + s^2 (C_3 L_3 g_m + 2C_5 L_3 g_m) + s (2C_5 R_3 g_m + C_5)}$$

$$10.67 \quad \text{INVALID-ORDER-67} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \frac{R_5}{C_5 R_5 s + 1}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 R_3 R_5 s^3 + R_3 R_5 g_m - R_3 + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3 - C_5 L_3 R_5) + s (-C_5 R_3 R_5 + L_3 R_5 g_m - L_3)}{2R_3 g_m + R_5 g_m + s^3 (2C_3 C_5 L_3 R_3 R_5 g_m + C_3 C_5 L_3 R_5) + s^2 (2C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3 + 2C_5 L_3 R_5 g_m) + s (2C_5 R_3 R_5 g_m + C_5 R_5 + 2L_3 g_m) + 1}$$

$$10.68 \quad \text{INVALID-ORDER-68} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m - C_3 C_5 L_3 R_3) + s^2 (C_3 L_3 R_3 g_m + C_5 L_3 R_5 g_m - C_5 L_3) + s (C_5 R_3 R_5 g_m - C_5 R_3 + L_3 g_m)}{g_m + s^3 (2C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3 R_5 g_m + C_3 C_5 L_3) + s^2 (C_3 L_3 g_m + 2C_5 L_3 g_m) + s (2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

$$10.69 \quad \text{INVALID-ORDER-69} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, L_5 s + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_3 L_5 R_3 g_m s^4 + R_3 g_m + s^3 (-C_3 C_5 L_3 R_3 + C_5 L_3 L_5 g_m) + s^2 (C_3 L_3 R_3 g_m - C_5 L_3 + C_5 L_5 R_3 g_m) + s (-C_5 R_3 + L_3 g_m)}{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (2C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3) + s^2 (C_3 L_3 g_m + 2C_5 L_3 g_m + C_5 L_5 g_m) + s (2C_5 R_3 g_m + C_5)}$$

$$10.70 \quad \text{INVALID-ORDER-70} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_3 s^4 - R_3 + s^3 (C_3 L_3 L_5 R_3 g_m - C_5 L_3 L_5) + s^2 (-C_3 L_3 R_3 - C_5 L_5 R_3 + L_3 L_5 g_m) + s (-L_3 + L_5 R_3 g_m)}{2R_3 g_m + s^4 (2C_3 C_5 L_3 L_5 R_3 g_m + C_3 C_5 L_3 L_5) + s^3 (C_3 L_3 L_5 g_m + 2C_5 L_3 L_5 g_m) + s^2 (2C_3 L_3 R_3 g_m + C_3 L_3 + 2C_5 L_5 R_3 g_m + C_5 L_5) + s (2L_3 g_m + L_5 g_m) + 1}$$

$$10.71 \quad \text{INVALID-ORDER-71} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, L_5 s + R_5 + \frac{1}{C_5 s}, \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_3 L_5 R_3 g_m s^4 + R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m - C_3 C_5 L_3 R_3 + C_5 L_3 L_5 g_m) + s^2 (C_3 L_3 R_3 g_m + C_5 L_3 R_5 g_m - C_5 L_3 + C_5 L_5 R_3 g_m) + s (C_5 R_3 R_5 g_m - C_5 R_3 + L_3 g_m)}{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (2C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3 R_5 g_m + C_3 C_5 L_3) + s^2 (C_3 L_3 g_m + 2C_5 L_3 g_m + C_5 L_5 g_m) + s (2C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

$$10.72 \quad \text{INVALID-ORDER-72} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_3 R_5 s^4 - R_3 R_5 + s^3 (C_3 L_3 L_5 R_3 R_5 g_m - C_3 L_3 L_5 R_3 - C_5 L_3 L_5 R_5) + s^2 (-C_3 L_3 R_3 R_5 - C_5 L_5 R_3 R_5 + L_3 L_5 R_5 g_m - L_3 L_5) + s (-L_3 R_5 + L_5 R_3 R_5 g_m - L_5 R_3)}{2R_3 R_5 g_m + R_5 + s^4 (2C_3 C_5 L_3 L_5 R_3 R_5 g_m + C_3 C_5 L_3 L_5 R_5) + s^3 (2C_3 L_3 L_5 R_3 g_m + C_3 L_3 L_5 R_5 g_m + C_3 L_3 L_5 + 2C_5 L_3 L_5 R_5 g_m) + s^2 (2C_3 L_3 R_3 R_5 g_m + C_3 L_3 R_5 + 2C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_5 + 2L_3 L_5 g_m) + s (2L_3 R_5 g_m + 2L_5 R_3 g_m + L_5 R_5 g_m + L_5)}$$

$$10.73 \quad \text{INVALID-ORDER-73} \quad Z(s) = \left(\infty, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \infty \right)$$

$$H(s) = \frac{R_3 R_5 g_m - R_3 + s^4 (C_3 C_5 L_3 L_5 R_3 R_5 g_m - C_3 C_5 L_3 L_5 R_3) + s^3 (C_3 L_3 L_5 R_3 g_m + C_5 L_3 L_5 R_5 g_m - C_5 L_3 L_5) + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3 + C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3 + L_3 L_5 g_m) + s (L_3 R_5 g_m - L_3 + L_5 R_3 g_m)}{2R_3 g_m + R_5 g_m + s^4 (2C_3 C_5 L_3 L_5 R_3 g_m + C_3 C_5 L_3 L_5 R_5 g_m + C_3 C_5 L_3 L_5) + s^3 (C_3 L_3 L_5 g_m + 2C_5 L_3 L_5 g_m) + s^2 (2C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3 + 2C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (2L_3 g_m + L_5 g_m) + 1}$$

$$\mathbf{10.74 \quad INVALID-ORDER-74} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \quad \infty, \quad \frac{R_5 (C_5 L_5 s^2 + 1)}{C_5 L_5 s^2 + C_5 R_5 s + 1}, \quad \infty \right)$$

$$H(s) = \frac{R_3 R_5 g_m - R_3 + s^4 (C_3 C_5 L_3 L_5 R_3 R_5 g_m - C_3 C_5 L_3 L_5 R_3) + s^3 (-C_3 C_5 L_3 R_3 R_5 + C_5 L_3 L_5 R_5 g_m - C_5 L_3 L_5) + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3 - C_5 L_3 R_5 + C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3) + s (-C_5 R_3 R_5 + L_3 R_5 g_m - L_3)}{2 R_3 g_m + R_5 g_m + s^4 (2 C_3 C_5 L_3 L_5 R_3 g_m + C_3 C_5 L_3 L_5 R_5 g_m + C_3 C_5 L_3 L_5) + s^3 (2 C_3 C_5 L_3 R_3 R_5 g_m + C_3 C_5 L_3 R_5 + 2 C_5 L_3 L_5 g_m) + s^2 (2 C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3 + 2 C_5 L_3 R_5 g_m + 2 C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (2 C_5 R_3 R_5 g_m + C_5 R_5 + 2 L_3 g_m) + 1}$$

$$\mathbf{10.75 \quad INVALID-ORDER-75} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \frac{1}{C_5 s}, \quad \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 R_3 s^3 + C_3 L_3 R_3 g_m s^2 - C_5 R_3 s + R_3 g_m}{g_m + s^3 (2 C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3) + s^2 (C_3 C_5 R_3 + C_3 L_3 g_m) + s (C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5)}$$

$$\mathbf{10.76 \quad INVALID-ORDER-76} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \frac{R_5}{C_5 R_5 s + 1}, \quad \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 R_3 R_5 s^3 - C_5 R_3 R_5 s + R_3 R_5 g_m - R_3 + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3)}{2 R_3 g_m + R_5 g_m + s^3 (2 C_3 C_5 L_3 R_3 R_5 g_m + C_3 C_5 L_3 R_5) + s^2 (C_3 C_5 R_3 R_5 + 2 C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3) + s (C_3 R_3 R_5 g_m + C_3 R_3 + 2 C_5 R_3 R_5 g_m + C_5 R_5) + 1}$$

$$\mathbf{10.77 \quad INVALID-ORDER-77} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad R_5 + \frac{1}{C_5 s}, \quad \infty \right)$$

$$H(s) = \frac{C_3 L_3 R_3 g_m s^2 + R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m - C_3 C_5 L_3 R_3) + s (C_5 R_3 R_5 g_m - C_5 R_3)}{g_m + s^3 (2 C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3 R_5 g_m + C_3 C_5 L_3) + s^2 (C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_3 + C_3 L_3 g_m) + s (C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

$$\mathbf{10.78 \quad INVALID-ORDER-78} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad L_5 s + \frac{1}{C_5 s}, \quad \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_3 L_5 R_3 g_m s^4 - C_3 C_5 L_3 R_3 s^3 - C_5 R_3 s + R_3 g_m + s^2 (C_3 L_3 R_3 g_m + C_5 L_5 R_3 g_m)}{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (2 C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3 + C_3 C_5 L_5 R_3 g_m) + s^2 (C_3 C_5 R_3 + C_3 L_3 g_m + C_5 L_5 g_m) + s (C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5)}$$

$$\mathbf{10.79 \quad INVALID-ORDER-79} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \frac{L_5 s}{C_5 L_5 s^2 + 1}, \quad \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_3 s^4 + C_3 L_3 L_5 R_3 g_m s^3 + L_5 R_3 g_m s - R_3 + s^2 (-C_3 L_3 R_3 - C_5 L_5 R_3)}{2 R_3 g_m + s^4 (2 C_3 C_5 L_3 L_5 R_3 g_m + C_3 C_5 L_3 L_5) + s^3 (C_3 C_5 L_5 R_3 + C_3 L_3 L_5 g_m) + s^2 (2 C_3 L_3 R_3 g_m + C_3 L_3 + C_3 L_5 R_3 g_m + 2 C_5 L_5 R_3 g_m + C_5 L_5) + s (C_3 R_3 + L_5 g_m) + 1}$$

$$\mathbf{10.80 \quad INVALID-ORDER-80} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad L_5 s + R_5 + \frac{1}{C_5 s}, \quad \infty \right)$$

$$H(s) = \frac{C_3 C_5 L_3 L_5 R_3 g_m s^4 + R_3 g_m + s^3 (C_3 C_5 L_3 R_3 R_5 g_m - C_3 C_5 L_3 R_3) + s^2 (C_3 L_3 R_3 g_m + C_5 L_5 R_3 g_m) + s (C_5 R_3 R_5 g_m - C_5 R_3)}{C_3 C_5 L_3 L_5 g_m s^4 + g_m + s^3 (2 C_3 C_5 L_3 R_3 g_m + C_3 C_5 L_3 R_5 g_m + C_3 C_5 L_3 + C_3 C_5 L_5 R_3 g_m) + s^2 (C_3 C_5 R_3 R_5 g_m + C_3 C_5 R_3 + C_3 L_3 g_m + C_5 L_5 g_m) + s (C_3 R_3 g_m + 2 C_5 R_3 g_m + C_5 R_5 g_m + C_5)}$$

$$\mathbf{10.81 \quad INVALID-ORDER-81} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \frac{L_5 R_5 s}{C_5 L_5 R_5 s^2 + L_5 s + R_5}, \quad \infty \right)$$

$$H(s) = \frac{-C_3 C_5 L_3 L_5 R_3 R_5 s^4 - R_3 R_5 + s^3 (C_3 L_3 L_5 R_3 R_5 g_m - C_3 L_3 L_5 R_3) + s^2 (-C_3 L_3 R_3 R_5 - C_5 L_5 R_3 R_5) + s (L_5 R_3 R_5 g_m - L_5 R_3)}{2 R_3 R_5 g_m + R_5 + s^4 (2 C_3 C_5 L_3 L_5 R_3 R_5 g_m + C_3 C_5 L_3 L_5 R_5) + s^3 (C_3 C_5 L_5 R_3 R_5 + 2 C_3 L_3 L_5 R_3 g_m + C_3 L_3 L_5 R_5 g_m + C_3 L_3 L_5) + s^2 (2 C_3 L_3 R_3 R_5 g_m + C_3 L_3 R_5 + C_3 L_5 R_3 R_5 g_m + C_3 L_5 R_3 + 2 C_5 L_5 R_3 R_5 g_m + C_5 L_5 R_5) + s (C_3 R_3 R_5 + 2 L_5 R_3 g_m + L_5 R_5 g_m + L_5)}$$

$$\mathbf{10.82 \quad INVALID-ORDER-82} \quad Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \frac{L_5 s}{C_5 L_5 s^2 + 1} + R_5, \quad \infty \right)$$

$$H(s) = \frac{C_3 L_3 L_5 R_3 g_m s^3 + L_5 R_3 g_m s + R_3 R_5 g_m - R_3 + s^4 (C_3 C_5 L_3 L_5 R_3 R_5 g_m - C_3 C_5 L_3 L_5 R_3) + s^2 (C_3 L_3 R_3 R_5 g_m - C_3 L_3 R_3 + C_5 L_5 R_3 R_5 g_m - C_5 L_5 R_3)}{2 R_3 g_m + R_5 g_m + s^4 (2 C_3 C_5 L_3 L_5 R_3 g_m + C_3 C_5 L_3 L_5 R_5 g_m + C_3 C_5 L_3 L_5) + s^3 (C_3 C_5 L_5 R_3 R_5 g_m + C_3 C_5 L_5 R_3 + C_3 L_3 L_5 g_m) + s^2 (2 C_3 L_3 R_3 g_m + C_3 L_3 R_5 g_m + C_3 L_3 + C_3 L_5 R_3 g_m + 2 C_5 L_5 R_3 g_m + C_5 L_5 R_5 g_m + C_5 L_5) + s (C_3 R_3 R_5 g_m + C_3 R_3 + L_5 g_m) + 1}$$

10.83 INVALID-ORDER-83

$$Z(s) = \left(\infty, \quad \infty, \quad \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \quad \infty, \quad \frac{R_5(C_5L_5s^2+1)}{C_5L_5s^2+C_5R_5s+1}, \quad \infty \right)$$

$$H(s) = \frac{-C_3C_5L_3R_3R_5s^3 - C_5R_3R_5s + R_3R_5g_m - R_3 + s^4(C_3C_5L_3L_5R_3R_5g_m - C_3C_5L_3L_5R_3) + s^2(C_3L_3R_3R_5g_m - C_3L_3R_3 + C_5L_5R_3R_5g_m - C_5L_5R_3)}{2R_3g_m + R_5g_m + s^4(2C_3C_5L_3L_5R_3g_m + C_3C_5L_3L_5R_5g_m + C_3C_5L_3L_5) + s^3(2C_3C_5L_3R_3R_5g_m + C_3C_5L_3R_5 + C_3C_5L_5R_3R_5g_m + C_3C_5L_5R_3) + s^2(C_3C_5R_3R_5 + 2C_3L_3R_3g_m + C_3L_3R_5g_m + C_3L_3 + 2C_5L_5R_3g_m + C_5L_5R_5g_m + C_5L_5) + s(C_3R_3R_5g_m + C_3R_3R_5)}$$

11 PolynomialError