Filter Summary Report: TIA simple Z5 ZL

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1 Examined $H(z)$ for TIA simple Z5 ZL: $\frac{Z_L(Z_5 g_m - 1)}{Z_5 g_m + 2 Z_L g_m + 1}$

$$H(z) = \frac{Z_L \left(Z_5 g_m - 1\right)}{Z_5 g_m + 2 Z_L g_m + 1}$$

2 HP

3 BP

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

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

Parameters:

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

3.2 BP-2 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

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

Parameters:

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

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

Parameters:

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

5.2 BS-2 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

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

Parameters:

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

6 GE

6.1 GE-1 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

Parameters:

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

K-LP: $\frac{R_4 g_m - 1}{2 g_m}$
K-HP: $\frac{R_4 g_m - 1}{2 g_m}$
K-BP: $\frac{R_L (R_4 g_m - 1)}{R_4 g_m + 2 R_L g_m + 1}$
Qz: $\frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_L}$
Wz: $\sqrt{\frac{1}{C_L L_L}}$

6.2 GE-2 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

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

Parameters:

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

6.3 GE-3 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{L_4 g_m \sqrt{\frac{1}{C_4 L_4}}}{2 R_L g_m + 1}$

wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2R_L g_m+1}{L_4 g_m}$
K-LP: R_L
K-HP: R_L
K-BP: $-\frac{R_L}{2R_L g_m+1}$
Qz: $-L_4 g_m \sqrt{\frac{1}{C_4 L_4}}$
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

6.4 GE-4 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{C_4\sqrt{\frac{1}{C_4 L_4}}(2R_L g_m+1)}{g_m}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{g_m}{C_4(2R_L g_m+1)}$
K-LP: $-\frac{R_L}{2R_L g_m+1}$
K-HP: $-\frac{R_L}{2R_L g_m+1}$
K-BP: R_L
Qz: $-\frac{C_4\sqrt{\frac{1}{C_4 L_4}}}{g_m}$
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

6.5 GE-5 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{L_4 g_m \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m + 2R_L g_m + 1}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{R_4 g_m + 2R_L g_m + 1}{L_4 g_m}$
K-LP: R_L
K-HP: R_L
K-BP: $\frac{R_L(R_4 g_m - 1)}{R_4 g_m + 2R_L g_m + 1}$
Qz: $\frac{L_4 g_m \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m - 1}$
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

6.6 GE-6 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}(2R_L g_m + 1)}{R_4 g_m + 2R_L g_m + 1}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{R_4 g_m + 2R_L g_m + 1}{C_4 R_4 (2R_L g_m + 1)}$
K-LP: $-\frac{R_L}{2R_L g_m + 1}$
K-HP: $-\frac{R_L}{2R_L g_m + 1}$
K-BP: $\frac{R_L(R_4 g_m - 1)}{R_4 g_m + 2R_L g_m + 1}$
Qz: $-\frac{C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m - 1}$
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

6.7 GE-7 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{C_4\sqrt{\frac{1}{C_4L_4}}(R_4g_m+2R_Lg_m+1)}{g_m}$
wo: $\sqrt{\frac{1}{C_4L_4}}$
bandwidth: $\frac{g_m}{C_4(R_4g_m+2R_Lg_m+1)}$
K-LP: $\frac{R_L(R_4g_m-1)}{R_4g_m+2R_Lg_m+1}$
K-HP: $\frac{R_L(R_4g_m-1)}{R_4g_m+2R_Lg_m+1}$
K-BP: R_L
Qz: $\frac{C_4\sqrt{\frac{1}{C_4L_4}}(R_4g_m-1)}{g_m}$
Wz: $\sqrt{\frac{1}{C_4L_4}}$

6.8 GE-8 $Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{R_L\left(C_4L_4R_4g_ms^2 - C_4L_4s^2 - C_4R_4s + R_4g_m - 1\right)}{C_4L_4R_4g_ms^2 + 2C_4L_4R_Lg_ms^2 + C_4L_4s^2 + 2C_4R_4R_Lg_ms + C_4R_4s + R_4g_m + 2R_Lg_m + 1}$$

Parameters:

Q: $\frac{L_4\sqrt{\frac{1}{C_4L_4}}(R_4g_m+2R_Lg_m+1)}{R_4(2R_Lg_m+1)}$
wo: $\sqrt{\frac{1}{C_4L_4}}$
bandwidth: $\frac{R_4(2R_Lg_m+1)}{L_4(R_4g_m+2R_Lg_m+1)}$
K-LP: $\frac{R_L(R_4g_m-1)}{R_4g_m+2R_Lg_m+1}$
K-HP: $\frac{R_L(R_4g_m-1)}{R_4g_m+2R_Lg_m+1}$
K-BP: $-\frac{R_L}{2R_Lg_m+1}$
Qz: $\frac{L_4\sqrt{\frac{1}{C_4L_4}}(-R_4g_m+1)}{R_4}$
Wz: $\sqrt{\frac{1}{C_4L_4}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{R_L\left(-C_4 s + g_m\right)}{C_4 C_L R_L s^2 + 2C_4 R_L g_m s + C_4 s + C_L R_L g_m s + g_m}$$

Parameters:

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

8.2 INVALID-NUMER-2 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

Parameters:

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

8.3 INVALID-NUMER-3 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

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

Parameters:

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

8.4 INVALID-NUMER-4 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{R_L\left(C_4 R_4 g_m s - C_4 s + g_m\right)}{C_4 C_L R_4 R_L g_m s^2 + C_4 C_L R_L s^2 + C_4 R_4 g_m s + 2C_4 R_L g_m s + C_4 s + C_L R_L g_m s + g_m}$$

Parameters:

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

9 INVALID-WZ

9.1 INVALID-WZ-1 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

Parameters:

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

wo: $\sqrt{2}\sqrt{\frac{g_m}{C_4 C_L R_4 (2R_L g_m + 1)}}$

bandwidth: $\frac{2C_4 R_4 g_m + C_L R_4 g_m + 2C_L R_L g_m + C_L}{C_4 C_L R_4 (2R_L g_m + 1)}$

K-LP: $\frac{R_4 g_m - 1}{2g_m}$

K-HP: $-\frac{R_L}{2R_L g_m + 1}$

K-BP: $\frac{-C_4 R_4 + C_L R_4 R_L g_m - C_L R_L}{2C_4 R_4 g_m + C_L R_4 g_m + 2C_L R_L g_m + C_L}$

Qz: $\frac{\sqrt{2} C_4 C_L R_4 R_L \sqrt{\frac{g_m}{C_4 C_L R_4 (2R_L g_m + 1)}}}{C_4 R_4 - C_L R_4 R_L g_m + C_L R_L}$

Wz: $\sqrt{\frac{-R_4 g_m + 1}{C_4 C_L R_4 R_L}}$

10 INVALID-ORDER

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

$$H(s) = \frac{R_L\,(R_4 g_m - 1)}{R_4 g_m + 2R_L g_m + 1}$$

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

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

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

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

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

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

10.5 INVALID-ORDER-5 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{R_L\left(-C_4 s + g_m\right)}{2C_4 R_L g_m s + C_4 s + g_m}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$$H(s) = \frac{-C_4 s + g_m}{s\left(C_4 C_L s + 2C_4 g_m + C_L g_m\right)}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

10.8 INVALID-ORDER-8 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

10.9 INVALID-ORDER-9 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L s\left(-C_4 s + g_m\right)}{C_4 C_L L_L s^3 + 2C_4 L_L g_m s^2 + C_4 s + C_L L_L g_m s^2 + g_m}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

10.11 INVALID-ORDER-11 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_L R_L s\left(-C_4 s + g_m\right)}{C_4 C_L L_L R_L s^3 + 2C_4 L_L R_L g_m s^2 + C_4 L_L s^2 + C_4 R_L s + C_L L_L R_L g_m s^2 + L_L g_m s + R_L g_m}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = -\frac{(C_4 s - g_m)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{2C_4 C_L L_L R_L g_m s^3 + C_4 C_L L_L s^3 + 2C_4 L_L g_m s^2 + 2C_4 R_L g_m s + C_4 s + C_L L_L g_m s^2 + g_m}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$$H(s) = -\frac{R_L\left(C_4 s - g_m\right)\left(C_L L_L s^2+1\right)}{2C_4C_L L_L R_L g_m s^3 + C_4C_L L_L s^3 + C_4C_L R_L s^2 + 2C_4 R_L g_m s + C_4 s + C_L L_L g_m s^2 + C_L R_L g_m s + g_m}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

10.15 INVALID-ORDER-15 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$

$$H(s) = -\frac{\left(C_L L_L s^2+1\right)\left(C_4 R_4 s - R_4 g_m + 1\right)}{2C_4C_L L_L R_4 g_m s^3 + C_4C_L R_4 s^2 + 2C_4 R_4 g_m s + 2C_L L_L g_m s^2 + C_L R_4 g_m s + C_L s + 2g_m}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L s\left(-C_4 R_4 s + R_4 g_m - 1\right)}{C_4C_L L_L R_4 s^3 + 2C_4 L_L R_4 g_m s^2 + C_4 R_4 s + C_L L_L R_4 g_m s^2 + C_L L_L s^2 + 2L_L g_m s + R_4 g_m + 1}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = -\frac{\left(C_4 R_4 s - R_4 g_m + 1\right)\left(C_L L_L s^2 + C_L R_L s + 1\right)}{2C_4C_L L_L R_4 g_m s^3 + 2C_4C_L R_4 R_L g_m s^2 + C_4C_L R_4 s^2 + 2C_4 R_4 g_m s + 2C_L L_L g_m s^2 + C_L R_4 g_m s + 2C_L R_L g_m s + C_L s + 2g_m}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$

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

10.19 INVALID-ORDER-19 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

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

10.20 INVALID-ORDER-20 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

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

10.21 INVALID-ORDER-21 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{R_L\left(C_4 R_4 g_m s - C_4 s + g_m\right)}{C_4 R_4 g_m s + 2C_4 R_L g_m s + C_4 s + g_m}$$

10.22 INVALID-ORDER-22 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_4 R_4 g_m s - C_4 s + g_m}{s\left(C_4 C_L R_4 g_m s + C_4 C_L s + 2C_4 g_m + C_L g_m\right)}$$

10.23 INVALID-ORDER-23 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

10.24 INVALID-ORDER-24 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

10.25 INVALID-ORDER-25 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L s\left(C_4 R_4 g_m s - C_4 s + g_m\right)}{C_4 C_L L_L R_4 g_m s^3 + C_4 C_L L_L s^3 + 2C_4 L_L g_m s^2 + C_4 R_4 g_m s + C_4 s + C_L L_L g_m s^2 + g_m}$$

10.26 INVALID-ORDER-26 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

10.27 INVALID-ORDER-27 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

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

10.28 INVALID-ORDER-28 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

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

10.29 INVALID-ORDER-29 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

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

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

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

10.31 INVALID-ORDER-31 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{R_L\left(C_4 L_4 g_m s^2 - C_4 s + g_m\right)}{C_4 C_L L_4 R_L g_m s^3 + C_4 C_L R_L s^2 + C_4 L_4 g_m s^2 + 2C_4 R_L g_m s + C_4 s + C_L R_L g_m s + g_m}$$

10.32 INVALID-ORDER-32 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

10.33 INVALID-ORDER-33 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

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

$$H(s) = \frac{L_L s \left(C_4 L_4 g_m s^2 - C_4 s + g_m\right)}{C_4 C_L L_4 L_L g_m s^4 + C_4 C_L L_L s^3 + C_4 L_4 g_m s^2 + 2C_4 L_L g_m s^2 + C_4 s + C_L L_L g_m s^2 + g_m}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

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

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

10.37 INVALID-ORDER-37 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

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

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

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

10.39 INVALID-ORDER-39 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

10.40 INVALID-ORDER-40 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

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

10.41 INVALID-ORDER-41 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

10.42 INVALID-ORDER-42 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

10.43 INVALID-ORDER-43 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

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

10.44 INVALID-ORDER-44 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

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

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

10.46 INVALID-ORDER-46 $Z(s) = \left(L_1 s + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

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

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

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

10.48 INVALID-ORDER-48 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

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

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

10.50 INVALID-ORDER-50 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

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

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

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

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

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

10.53 INVALID-ORDER-53 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{\left(C_L L_L s^2 + C_L R_L s + 1\right)\left(C_4 L_4 g_m s^2 + C_4 R_4 g_m s - C_4 s + g_m\right)}{s\left(C_4 C_L L_4 g_m s^2 + 2C_4 C_L L_L g_m s^2 + C_4 C_L R_4 g_m s + 2C_4 C_L R_L g_m s + C_4 C_L s + 2C_4 g_m + C_L g_m\right)}$$

10.54 INVALID-ORDER-54 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$

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

10.55 INVALID-ORDER-55 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

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

10.56 INVALID-ORDER-56 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

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

10.57 INVALID-ORDER-57 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

10.58 INVALID-ORDER-58 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

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

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

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

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

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

10.61 INVALID-ORDER-61 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$

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

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

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

10.63 INVALID-ORDER-63 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

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

10.64 INVALID-ORDER-64 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

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

10.65 INVALID-ORDER-65 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

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

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

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

10.67 INVALID-ORDER-67 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

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

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

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

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

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

10.70 INVALID-ORDER-70 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} \right)$

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

10.71 INVALID-ORDER-71 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s} \right)$

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

10.72 INVALID-ORDER-72 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

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

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

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

10.74 INVALID-ORDER-74 $Z(s) = \left(\frac{1}{C_1 s + \frac{1}{R_1} + \frac{1}{L_1 s}},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L \left(L_L s + \frac{1}{C_L s} \right)}{L_L s + R_L + \frac{1}{C_L s}} \right)$

$$H(s) = \frac{R_L \left(C_L L_L s^2 + 1 \right) \left(C_4 L_4 R_4 g_m s^2 - C_4 L_4 s^2 + L_4 g_m s + R_4 g_m - 1 \right.}{C_4 C_L L_4 L_L R_4 g_m s^4 + 2 C_4 C_L L_4 L_L R_L g_m s^4 + C_4 C_L L_4 L_L s^4 + C_4 C_L L_4 R_4 R_L g_m s^3 + C_4 C_L L_4 R_L s^3 + C_4 L_4 R_4 g_m s^2 + 2 C_4 L_4 R_L g_m s^2 + C_4 L_4 s^2 + C_L L_4 L_L g_m s^3 + C_L L_4 R_L g_$$

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

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

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

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

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

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

10.78 INVALID-ORDER-78 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

10.79 INVALID-ORDER-79 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

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

10.80 INVALID-ORDER-80 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

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

10.81 INVALID-ORDER-81 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}} \right)$

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

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

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

10.83 INVALID-ORDER-83 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1} + R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}} \right)$

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