Filter Summary Report: CG,Test,simple,Z3,ZL

Generated by MacAnalog-Symbolix

December 19, 2024

Contents

1 Examined $H(z)$ for CG Test simple Z3 ZL: $\frac{Z_3 Z_L g_m}{Z_3+Z_L}$

$$H(z) = \frac{Z_3 Z_L g_m}{Z_3 + Z_L}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L R_3 g_m s}{C_L L_L R_3 s^2 + L_L s + R_3}$$

Parameters:

Q: $C_L R_3 \sqrt{\frac{1}{C_L L_L}}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{1}{C_L R_3}$
K-LP: 0
K-HP: 0
K-BP: $R_3 g_m$
Qz: 0
Wz: None

3.2 BP-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2+L_L s+R_L}\right)$

$$H(s) = \frac{L_L R_3 R_L g_m s}{C_L L_L R_3 R_L s^2 + R_3 R_L + s\left(L_L R_3 + L_L R_L\right)}$$

Parameters:

Q: $\frac{C_L R_3 R_L \sqrt{\frac{1}{C_L L_L}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_3+R_L}{C_L R_3 R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L g_m}{R_3+R_L}$
Qz: 0
Wz: None

3.3 BP-3 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2+L_L s+R_L}\right)$

$$H(s) = \frac{L_L R_L g_m s}{L_L s + R_L + s^2\left(C_3 L_L R_L + C_L L_L R_L\right)}$$

Parameters:

Q: $R_L \sqrt{\frac{1}{L_L(C_3+C_L)}}\left(C_3 + C_L\right)$
wo: $\sqrt{\frac{1}{L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $R_L g_m$
Qz: 0

Wz: None

3.4 BP-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{L_LR_3g_ms}{L_Ls + R_3 + s^2\left(C_3L_LR_3 + C_LL_LR_3\right)}$$

Parameters:

Q: $R_3\sqrt{\frac{1}{L_L(C_3+C_L)}}\left(C_3+C_L\right)$
wo: $\sqrt{\frac{1}{L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_3(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_3g_m
Qz: 0
Wz: None

3.5 BP-5 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L}\right)$

$$H(s) = \frac{L_LR_3R_Lg_ms}{R_3R_L + s^2\left(C_3L_LR_3R_L + C_LL_LR_3R_L\right) + s\left(L_LR_3 + L_LR_L\right)}$$

Parameters:

Q: $\frac{R_3R_L\sqrt{\frac{1}{L_L(C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{1}{L_L(C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_Lg_m}{R_3+R_L}$
Qz: 0
Wz: None

3.6 BP-6 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{L_3R_Lg_ms}{C_3L_3R_Ls^2 + L_3s + R_L}$$

Parameters:

Q: $C_3R_L\sqrt{\frac{1}{C_3L_3}}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{1}{C_3R_L}$
K-LP: 0
K-HP: 0
K-BP: R_Lg_m
Qz: 0
Wz: None

3.7 BP-7 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{L_3R_Lg_ms}{L_3s + R_L + s^2\left(C_3L_3R_L + C_LL_3R_L\right)}$$

Parameters:

Q: $R_L\sqrt{\frac{1}{L_3(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $R_L g_m$
Qz: 0
Wz: None

3.8 BP-8 $Z(s)=\left(\infty,\ \infty,\ \frac{L_3 s}{C_3L_3s^2+1},\ \infty,\ \infty,\ \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L}\right)$

$$H(s)=\frac{L_3L_LR_Lg_ms}{L_3L_Ls+L_3R_L+L_LR_L+s^2\left(C_3L_3L_LR_L+C_LL_3L_LR_L\right)}$$

Parameters:

Q: $R_L\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $R_L g_m$
Qz: 0
Wz: None

3.9 BP-9 $Z(s)=\left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ R_L\right)$

$$H(s)=\frac{L_3R_3R_Lg_ms}{C_3L_3R_3R_Ls^2+R_3R_L+s\left(L_3R_3+L_3R_L\right)}$$

Parameters:

Q: $\frac{C_3R_3R_L\sqrt{\frac{1}{C_3L_3}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{R_3+R_L}{C_3R_3R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_Lg_m}{R_3+R_L}$
Qz: 0
Wz: None

3.10 BP-10 $Z(s)=\left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$$H(s)=\frac{L_3R_3g_ms}{L_3s+R_3+s^2\left(C_3L_3R_3+C_LL_3R_3\right)}$$

Parameters:

Q: $R_3\sqrt{\frac{1}{L_3(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{1}{R_3(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $R_3 g_m$
Qz: 0
Wz: None

3.11 BP-11 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{L_3R_3R_Lg_ms}{R_3R_L + s^2\left(C_3L_3R_3R_L + C_LL_3R_3R_L\right) + s\left(L_3R_3 + L_3R_L\right)}$$

Parameters:

Q: $\frac{R_3R_L\sqrt{\frac{1}{L_3(C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_Lg_m}{R_3+R_L}$
Qz: 0
Wz: None

3.12 BP-12 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{L_3L_LR_3g_ms}{L_3L_Ls + L_3R_3 + L_LR_3 + s^2\left(C_3L_3L_LR_3 + C_LL_3L_LR_3\right)}$$

Parameters:

Q: $R_3\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}\left(C_3+C_L\right)$
wo: $\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_3(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_3g_m
Qz: 0
Wz: None

3.13 BP-13 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L}\right)$

$$H(s) = \frac{L_3L_LR_3R_Lg_ms}{L_3R_3R_L + L_LR_3R_L + s^2\left(C_3L_3L_LR_3R_L + C_LL_3L_LR_3R_L\right) + s\left(L_3L_LR_3 + L_3L_LR_L\right)}$$

Parameters:

Q: $\frac{R_3R_L\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{L_3+L_L}{L_3L_L(C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_Lg_m}{R_3+R_L}$
Qz: 0
Wz: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_L R_3 g_m s^2 + R_3 g_m}{C_L L_L s^2 + C_L R_3 s + 1}$$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}}}{R_3}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_3}{L_L}$
K-LP: $R_3 g_m$
K-HP: $R_3 g_m$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.2 BS-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_L L_L R_3 R_L g_m s^2 + R_3 R_L g_m}{C_L R_3 R_L s + R_3 + R_L + s^2\left(C_L L_L R_3 + C_L L_L R_L\right)}$$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}} (R_3+R_L)}{R_3 R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_3 R_L}{L_L (R_3+R_L)}$
K-LP: $\frac{R_3 R_L g_m}{R_3+R_L}$
K-HP: $\frac{R_3 R_L g_m}{R_3+R_L}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.3 BS-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_L}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_L}{L_3}$
K-LP: $R_L g_m$
K-HP: $R_L g_m$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

5.4 BS-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{C_3 L_3 R_3 R_L g_m s^2 + R_3 R_L g_m}{C_3 R_3 R_L s + R_3 + R_L + s^2\left(C_3 L_3 R_3 + C_3 L_3 R_L\right)}$$

Parameters:

Q: $\frac{L_3\sqrt{\frac{1}{C_3L_3}}(R_3+R_L)}{R_3R_L}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{R_3R_L}{L_3(R_3+R_L)}$
K-LP: $\frac{R_3R_Lg_m}{R_3+R_L}$
K-HP: $\frac{R_3R_Lg_m}{R_3+R_L}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_3L_3}}$

6 GE

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

$$H(s) = \frac{C_LL_LR_3g_ms^2 + C_LR_3R_Lg_ms + R_3g_m}{C_LL_Ls^2 + s\left(C_LR_3 + C_LR_L\right) + 1}$$

Parameters:

Q: $\frac{L_L\sqrt{\frac{1}{C_LL_L}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_LL_L}}$
bandwidth: $\frac{R_3+R_L}{L_L}$
K-LP: R_3g_m
K-HP: R_3g_m
K-BP: $\frac{R_3R_Lg_m}{R_3+R_L}$
Qz: $\frac{L_L\sqrt{\frac{1}{C_LL_L}}}{R_L}$
Wz: $\sqrt{\frac{1}{C_LL_L}}$

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

$$H(s) = \frac{C_LL_LR_3R_Lg_ms^2 + L_LR_3g_ms + R_3R_Lg_m}{L_Ls + R_3 + R_L + s^2\left(C_LL_LR_3 + C_LL_LR_L\right)}$$

Parameters:

Q: $C_L\sqrt{\frac{1}{C_LL_L}}\left(R_3+R_L\right)$
wo: $\sqrt{\frac{1}{C_LL_L}}$
bandwidth: $\frac{1}{C_L(R_3+R_L)}$
K-LP: $\frac{R_3R_Lg_m}{R_3+R_L}$
K-HP: $\frac{R_3R_Lg_m}{R_3+R_L}$
K-BP: R_3g_m
Qz: $C_LR_L\sqrt{\frac{1}{C_LL_L}}$
Wz: $\sqrt{\frac{1}{C_LL_L}}$

6.3 GE-3 $Z(s) = \left(\infty,\ \infty,\ L_3s + R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{C_3L_3R_Lg_ms^2 + C_3R_3R_Lg_ms + R_Lg_m}{C_3L_3s^2 + s\left(C_3R_3 + C_3R_L\right) + 1}$$

Parameters:

Q: $\frac{L_3\sqrt{\frac{1}{C_3L_3}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_3L_3}}$

bandwidth: $\frac{R_3+R_L}{L_3}$
K-LP: $R_L g_m$
K-HP: $R_L g_m$
K-BP: $\frac{R_3 R_L g_m}{R_3+R_L}$
Qz: $\frac{L_3\sqrt{\frac{1}{C_3 L_3}}}{R_3}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

6.4 GE-4 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{C_3 L_3 R_3 R_L g_m s^2 + L_3 R_L g_m s + R_3 R_L g_m}{L_3 s + R_3 + R_L + s^2\left(C_3 L_3 R_3 + C_3 L_3 R_L\right)}$$

Parameters:

Q: $C_3\sqrt{\frac{1}{C_3 L_3}}\left(R_3 + R_L\right)$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{1}{C_3(R_3+R_L)}$
K-LP: $\frac{R_3 R_L g_m}{R_3+R_L}$
K-HP: $\frac{R_3 R_L g_m}{R_3+R_L}$
K-BP: $R_L g_m$
Qz: $C_3 R_3\sqrt{\frac{1}{C_3 L_3}}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L R_3 R_L g_m s + R_3 g_m}{C_3 C_L R_3 R_L s^2 + s\left(C_3 R_3 + C_L R_3 + C_L R_L\right) + 1}$$

Parameters:

Q: $\frac{C_3 C_L R_3 R_L\sqrt{\frac{1}{C_3 C_L R_3 R_L}}}{C_3 R_3 + C_L R_3 + C_L R_L}$
wo: $\sqrt{\frac{1}{C_3 C_L R_3 R_L}}$
bandwidth: $\frac{C_3 R_3 + C_L R_3 + C_L R_L}{C_3 C_L R_3 R_L}$
K-LP: $R_3 g_m$
K-HP: 0
K-BP: $\frac{C_L R_3 R_L g_m}{C_3 R_3 + C_L R_3 + C_L R_L}$
Qz: 0
Wz: None

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

$$H(s) = \frac{C_3 R_3 R_L g_m s + R_L g_m}{C_3 C_L R_3 R_L s^2 + s\left(C_3 R_3 + C_3 R_L + C_L R_L\right) + 1}$$

Parameters:

Q: $\frac{C_3 C_L R_3 R_L\sqrt{\frac{1}{C_3 C_L R_3 R_L}}}{C_3 R_3 + C_3 R_L + C_L R_L}$
wo: $\sqrt{\frac{1}{C_3 C_L R_3 R_L}}$

bandwidth: $\frac{C_3R_3+C_3R_L+C_LR_L}{C_3C_LR_3R_L}$
K-LP: R_Lg_m
K-HP: 0
K-BP: $\frac{C_3R_3R_Lg_m}{C_3R_3+C_3R_L+C_LR_L}$
Qz: 0
Wz: None

9 INVALID-WZ

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L)$

$$H(s) = \frac{R_3R_Lg_m}{R_3+R_L}$$

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

$$H(s) = \frac{R_3g_m}{C_LR_3s+1}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{R_3R_Lg_m}{C_LR_3R_Ls+R_3+R_L}$$

10.4 INVALID-ORDER-4 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_LR_3R_Lg_ms+R_3g_m}{s\left(C_LR_3+C_LR_L\right)+1}$$

10.5 INVALID-ORDER-5 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{R_Lg_m}{C_3R_Ls+1}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$$H(s) = \frac{g_m}{s\left(C_3+C_L\right)}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{R_Lg_m}{s\left(C_3R_L+C_LR_L\right)+1}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L R_L g_m s + g_m}{C_3 C_L R_L s^2 + s\left(C_3 + C_L\right)}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_L g_m s^2 + g_m}{C_3 C_L L_L s^3 + s\left(C_3 + C_L\right)}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$

$$H(s) = \frac{L_L g_m s}{s^2\left(C_3 L_L + C_L L_L\right) + 1}$$

10.11 INVALID-ORDER-11 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_L g_m s^2 + C_L R_L g_m s + g_m}{C_3 C_L L_L s^3 + C_3 C_L R_L s^2 + s\left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_L L_L R_L g_m s^2 + L_L g_m s + R_L g_m}{C_3 C_L L_L R_L s^3 + C_3 R_L s + s^2\left(C_3 L_L + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_L L_L R_L g_m s^2 + R_L g_m}{C_3 C_L L_L R_L s^3 + C_L L_L s^2 + s\left(C_3 R_L + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{R_3 R_L g_m}{C_3 R_3 R_L s + R_3 + R_L}$$

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

$$H(s) = \frac{R_3 g_m}{s\left(C_3 R_3 + C_L R_3\right) + 1}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s + 1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_3 R_L g_m}{R_3 + R_L + s\left(C_3 R_3 R_L + C_L R_3 R_L\right)}$$

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

$$H(s) = \frac{C_L L_L R_3 g_m s^2 + R_3 g_m}{C_3 C_L L_L R_3 s^3 + C_L L_L s^2 + s\left(C_3 R_3 + C_L R_3\right) + 1}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ L_Ls + R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_LL_LR_3g_ms^2 + C_LR_3R_Lg_ms + R_3g_m}{C_3C_LL_LR_3s^3 + s^2\left(C_3C_LR_3R_L + C_LL_L\right) + s\left(C_3R_3 + C_LR_3 + C_LR_L\right) + 1}$$

10.19 INVALID-ORDER-19 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1} + R_L\right)$

$$H(s) = \frac{C_LL_LR_3R_Lg_ms^2 + L_LR_3g_ms + R_3R_Lg_m}{C_3C_LL_LR_3R_Ls^3 + R_3 + R_L + s^2\left(C_3L_LR_3 + C_LL_LR_3 + C_LL_LR_L\right) + s\left(C_3R_3R_L + L_L\right)}$$

10.20 INVALID-ORDER-20 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L\left(C_LL_Ls^2+1\right)}{C_LL_Ls^2+C_LR_Ls+1}\right)$

$$H(s) = \frac{C_LL_LR_3R_Lg_ms^2 + R_3R_Lg_m}{C_3C_LL_LR_3R_Ls^3 + R_3 + R_L + s^2\left(C_LL_LR_3 + C_LL_LR_L\right) + s\left(C_3R_3R_L + C_LR_3R_L\right)}$$

10.21 INVALID-ORDER-21 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{C_3R_3R_Lg_ms + R_Lg_m}{s\left(C_3R_3 + C_3R_L\right) + 1}$$

10.22 INVALID-ORDER-22 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3R_3g_ms + g_m}{C_3C_LR_3s^2 + s\left(C_3 + C_L\right)}$$

10.23 INVALID-ORDER-23 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LR_3R_Lg_ms^2 + g_m + s\left(C_3R_3g_m + C_LR_Lg_m\right)}{s^2\left(C_3C_LR_3 + C_3C_LR_L\right) + s\left(C_3 + C_L\right)}$$

10.24 INVALID-ORDER-24 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LL_LR_3g_ms^3 + C_3R_3g_ms + C_LL_Lg_ms^2 + g_m}{C_3C_LL_Ls^3 + C_3C_LR_3s^2 + s\left(C_3 + C_L\right)}$$

10.25 INVALID-ORDER-25 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{C_3L_LR_3g_ms^2 + L_Lg_ms}{C_3C_LL_LR_3s^3 + C_3R_3s + s^2\left(C_3L_L + C_LL_L\right) + 1}$$

10.26 INVALID-ORDER-26 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls + R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LL_LR_3g_ms^3 + g_m + s^2\left(C_3C_LR_3R_Lg_m + C_LL_Lg_m\right) + s\left(C_3R_3g_m + C_LR_Lg_m\right)}{C_3C_LL_Ls^3 + s^2\left(C_3C_LR_3 + C_3C_LR_L\right) + s\left(C_3 + C_L\right)}$$

10.27 INVALID-ORDER-27 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L}\right)$

$$H(s) = \frac{C_3L_LR_3R_Lg_ms^2 + L_LR_Lg_ms}{C_3C_LL_LR_3R_Ls^3 + R_L + s^2\left(C_3L_LR_3 + C_3L_LR_L + C_LL_LR_L\right) + s\left(C_3R_3R_L + L_L\right)}$$

10.28 INVALID-ORDER-28 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_3 C_L L_L R_3 R_L g_m s^3 + R_L g_m + s^2 \left(C_3 L_L R_3 g_m + C_L L_L R_L g_m\right) + s \left(C_3 R_3 R_L g_m + L_L g_m\right)}{s^3 \left(C_3 C_L L_L R_3 + C_3 C_L L_L R_L\right) + s^2 \left(C_3 L_L + C_L L_L\right) + s \left(C_3 R_3 + C_3 R_L\right) + 1}$$

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

$$H(s) = \frac{C_3 C_L L_L R_3 R_L g_m s^3 + C_3 R_3 R_L g_m s + C_L L_L R_L g_m s^2 + R_L g_m}{s^3 \left(C_3 C_L L_L R_3 + C_3 C_L L_L R_L\right) + s^2 \left(C_3 C_L R_3 R_L + C_L L_L\right) + s \left(C_3 R_3 + C_3 R_L + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_3 L_3 g_m s^2 + g_m}{C_3 C_L L_3 s^3 + s \left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 L_3 R_L g_m s^2 + R_L g_m}{C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + s \left(C_3 R_L + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_3 C_L L_3 R_L g_m s^3 + C_3 L_3 g_m s^2 + C_L R_L g_m s + g_m}{C_3 C_L L_3 s^3 + C_3 C_L R_L s^2 + s \left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 C_L L_3 L_L g_m s^4 + g_m + s^2 \left(C_3 L_3 g_m + C_L L_L g_m\right)}{s^3 \left(C_3 C_L L_3 + C_3 C_L L_L\right) + s \left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 L_3 L_L g_m s^3 + L_L g_m s}{C_3 C_L L_3 L_L s^4 + s^2 \left(C_3 L_3 + C_3 L_L + C_L L_L\right) + 1}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L g_m s^4 + C_3 C_L L_3 R_L g_m s^3 + C_L R_L g_m s + g_m + s^2 \left(C_3 L_3 g_m + C_L L_L g_m\right)}{C_3 C_L R_L s^2 + s^3 \left(C_3 C_L L_3 + C_3 C_L L_L\right) + s \left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 L_3 L_L R_L g_m s^3 + L_L R_L g_m s}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + L_L s + R_L + s^2 \left(C_3 L_3 R_L + C_3 L_L R_L + C_L L_L R_L\right)}$$

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

$$H(s) = \frac{C_3 C_L L_3 L_L R_L g_m s^4 + C_3 L_3 L_L g_m s^3 + L_L g_m s + R_L g_m + s^2 \left(C_3 L_3 R_L g_m + C_L L_L R_L g_m\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_L s^3 + C_3 R_L s + s^2 \left(C_3 L_3 + C_3 L_L + C_L L_L\right) + 1}$$

10.38 INVALID-ORDER-38 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L R_L g_m s^4 + R_L g_m + s^2 \left(C_3 L_3 R_L g_m + C_L L_L R_L g_m\right)}{C_3 C_L L_3 L_L s^4 + s^3 \left(C_3 C_L L_3 R_L + C_3 C_L L_L R_L\right) + s^2 \left(C_3 L_3 + C_L L_L\right) + s \left(C_3 R_L + C_L R_L\right) + 1}$$

10.39 INVALID-ORDER-39 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$$H(s) = \frac{L_3 g_m s}{s^2 \left(C_3 L_3 + C_L L_3\right) + 1}$$

10.40 INVALID-ORDER-40 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_3 R_L g_m s^2 + L_3 g_m s}{C_3 C_L L_3 R_L s^3 + C_L R_L s + s^2 \left(C_3 L_3 + C_L L_3\right) + 1}$$

10.41 INVALID-ORDER-41 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_3 L_L g_m s^3 + L_3 g_m s}{C_3 C_L L_3 L_L s^4 + s^2 \left(C_3 L_3 + C_L L_3 + C_L L_L\right) + 1}$$

10.42 INVALID-ORDER-42 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_3 L_L g_m s}{L_3 + L_L + s^2 \left(C_3 L_3 L_L + C_L L_3 L_L\right)}$$

10.43 INVALID-ORDER-43 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_3 L_L g_m s^3 + C_L L_3 R_L g_m s^2 + L_3 g_m s}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_L R_L s + s^2 \left(C_3 L_3 + C_L L_3 + C_L L_L\right) + 1}$$

10.44 INVALID-ORDER-44 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_L L_3 L_L R_L g_m s^3 + L_3 L_L g_m s^2 + L_3 R_L g_m s}{C_3 C_L L_3 L_L R_L s^4 + R_L + s^3 \left(C_3 L_3 L_L + C_L L_3 L_L\right) + s^2 \left(C_3 L_3 R_L + C_L L_L R_L\right) + s \left(L_3 + L_L\right)}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_L L_3 L_L R_L g_m s^3 + L_3 R_L g_m s}{C_3 C_L L_3 L_L R_L s^4 + C_L L_3 L_L s^3 + L_3 s + R_L + s^2 \left(C_3 L_3 R_L + C_L L_3 R_L + C_L L_L R_L\right)}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_3 L_3 g_m s^2 + C_3 R_3 g_m s + g_m}{C_3 C_L L_3 s^3 + C_3 C_L R_3 s^2 + s\left(C_3 + C_L\right)}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{C_3 L_3 R_L g_m s^2 + C_3 R_3 R_L g_m s + R_L g_m}{C_3 C_L L_3 R_L s^3 + s^2\left(C_3 C_L R_3 R_L + C_3 L_3\right) + s\left(C_3 R_3 + C_3 R_L + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_3 C_L L_3 R_L g_m s^3 + g_m + s^2\left(C_3 C_L R_3 R_L g_m + C_3 L_3 g_m\right) + s\left(C_3 R_3 g_m + C_L R_L g_m\right)}{C_3 C_L L_3 s^3 + s^2\left(C_3 C_L R_3 + C_3 C_L R_L\right) + s\left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 C_L L_3 L_L g_m s^4 + C_3 C_L L_L R_3 g_m s^3 + C_3 R_3 g_m s + g_m + s^2\left(C_3 L_3 g_m + C_L L_L g_m\right)}{C_3 C_L R_3 s^2 + s^3\left(C_3 C_L L_3 + C_3 C_L L_L\right) + s\left(C_3 + C_L\right)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{C_3 L_3 L_L g_m s^3 + C_3 L_L R_3 g_m s^2 + L_L g_m s}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_3 s^3 + C_3 R_3 s + s^2\left(C_3 L_3 + C_3 L_L + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_3 C_L L_3 L_L g_m s^4 + g_m + s^3\left(C_3 C_L L_3 R_L g_m + C_3 C_L L_L R_3 g_m\right) + s^2\left(C_3 C_L R_3 R_L g_m + C_3 L_3 g_m + C_L L_L g_m\right) + s\left(C_3 R_3 g_m + C_L R_L g_m\right)}{s^3\left(C_3 C_L L_3 + C_3 C_L L_L\right) + s^2\left(C_3 C_L R_3 + C_3 C_L R_L\right) + s\left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{C_3 L_3 L_L R_L g_m s^3 + C_3 L_L R_3 R_L g_m s^2 + L_L R_L g_m s}{C_3 C_L L_3 L_L R_L s^4 + R_L + s^3\left(C_3 C_L L_L R_3 R_L + C_3 L_3 L_L\right) + s^2\left(C_3 L_3 R_L + C_3 L_L R_3 + C_3 L_L R_L + C_L L_L R_L\right) + s\left(C_3 R_3 R_L + L_L\right)}$$

10.53 INVALID-ORDER-53 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L R_L g_m s^4 + R_L g_m + s^3\left(C_3 C_L L_L R_3 R_L g_m + C_3 L_3 L_L g_m\right) + s^2\left(C_3 L_3 R_L g_m + C_3 L_L R_3 g_m + C_L L_L R_L g_m\right) + s\left(C_3 R_3 R_L g_m + L_L g_m\right)}{C_3 C_L L_3 L_L s^4 + s^3\left(C_3 C_L L_L R_3 + C_3 C_L L_L R_L\right) + s^2\left(C_3 L_3 + C_3 L_L + C_L L_L\right) + s\left(C_3 R_3 + C_3 R_L\right) + 1}$$

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

$$H(s) = \frac{C_3 C_L L_3 L_L R_L g_m s^4 + C_3 C_L L_L R_3 R_L g_m s^3 + C_3 R_3 R_L g_m s + R_L g_m + s^2\left(C_3 L_3 R_L g_m + C_L L_L R_L g_m\right)}{C_3 C_L L_3 L_L s^4 + s^3\left(C_3 C_L L_3 R_L + C_3 C_L L_L R_3 + C_3 C_L L_L R_L\right) + s^2\left(C_3 C_L R_3 R_L + C_3 L_3 + C_L L_L\right) + s\left(C_3 R_3 + C_3 R_L + C_L R_L\right) + 1}$$

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_LL_3R_3R_Lg_ms^2 + L_3R_3g_ms}{C_3C_LL_3R_3R_Ls^3 + R_3 + s^2\left(C_3L_3R_3 + C_LL_3R_3 + C_LL_3R_L\right) + s\left(C_LR_3R_L + L_3\right)}$$

10.56 INVALID-ORDER-56 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_LL_3L_LR_3g_ms^3 + L_3R_3g_ms}{C_3C_LL_3L_LR_3s^4 + C_LL_3L_Ls^3 + L_3s + R_3 + s^2\left(C_3L_3R_3 + C_LL_3R_3 + C_LL_LR_3\right)}$$

10.57 INVALID-ORDER-57 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_LL_3L_LR_3g_ms^3 + C_LL_3R_3R_Lg_ms^2 + L_3R_3g_ms}{C_3C_LL_3L_LR_3s^4 + R_3 + s^3\left(C_3C_LL_3R_3R_L + C_LL_3L_L\right) + s^2\left(C_3L_3R_3 + C_LL_3R_3 + C_LL_3R_L + C_LL_LR_3\right) + s\left(C_LR_3R_L + L_3\right)}$$

10.58 INVALID-ORDER-58 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$

$$H(s) = \frac{C_LL_3L_LR_3R_Lg_ms^3 + L_3L_LR_3g_ms^2 + L_3R_3R_Lg_ms}{C_3C_LL_3L_LR_3R_Ls^4 + R_3R_L + s^3\left(C_3L_3L_LR_3 + C_LL_3L_LR_3 + C_LL_3L_LR_L\right) + s^2\left(C_3L_3R_3R_L + C_LL_LR_3R_L + L_3L_L\right) + s\left(L_3R_3 + L_3R_L + L_LR_3\right)}$$

10.59 INVALID-ORDER-59 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \infty,\ \infty,\ \frac{R_L\left(C_LL_Ls^2+1\right)}{C_LL_Ls^2+C_LR_Ls+1}\right)$

$$H(s) = \frac{C_LL_3L_LR_3R_Lg_ms^3 + L_3R_3R_Lg_ms}{C_3C_LL_3L_LR_3R_Ls^4 + R_3R_L + s^3\left(C_LL_3L_LR_3 + C_LL_3L_LR_L\right) + s^2\left(C_3L_3R_3R_L + C_LL_3R_3R_L + C_LL_LR_3R_L\right) + s\left(L_3R_3 + L_3R_L\right)}$$

10.60 INVALID-ORDER-60 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1}+R_3,\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3L_3R_3g_ms^2 + L_3g_ms + R_3g_m}{C_3C_LL_3R_3s^3 + C_LR_3s + s^2\left(C_3L_3 + C_LL_3\right) + 1}$$

10.61 INVALID-ORDER-61 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1}+R_3,\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{C_3L_3R_3R_Lg_ms^2 + L_3R_Lg_ms + R_3R_Lg_m}{C_3C_LL_3R_3R_Ls^3 + R_3 + R_L + s^2\left(C_3L_3R_3 + C_3L_3R_L + C_LL_3R_L\right) + s\left(C_LR_3R_L + L_3\right)}$$

10.62 INVALID-ORDER-62 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1}+R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LL_3R_3R_Lg_ms^3 + R_3g_m + s^2\left(C_3L_3R_3g_m + C_LL_3R_Lg_m\right) + s\left(C_LR_3R_Lg_m + L_3g_m\right)}{s^3\left(C_3C_LL_3R_3 + C_3C_LL_3R_L\right) + s^2\left(C_3L_3 + C_LL_3\right) + s\left(C_LR_3 + C_LR_L\right) + 1}$$

10.63 INVALID-ORDER-63 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1}+R_3,\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LL_3L_LR_3g_ms^4 + C_LL_3L_Lg_ms^3 + L_3g_ms + R_3g_m + s^2\left(C_3L_3R_3g_m + C_LL_LR_3g_m\right)}{C_3C_LL_3L_Ls^4 + C_3C_LL_3R_3s^3 + C_LR_3s + s^2\left(C_3L_3 + C_LL_3 + C_LL_L\right) + 1}$$

10.64 INVALID-ORDER-64 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{C_3 L_3 L_L R_3 g_m s^3 + L_3 L_L g_m s^2 + L_L R_3 g_m s}{C_3 C_L L_3 L_L R_3 s^4 + R_3 + s^3 (C_3 L_3 L_L + C_L L_3 L_L) + s^2 (C_3 L_3 R_3 + C_L L_L R_3) + s (L_3 + L_L)}$$

10.65 INVALID-ORDER-65 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L R_3 g_m s^4 + R_3 g_m + s^3 (C_3 C_L L_3 R_3 R_L g_m + C_L L_3 L_L g_m) + s^2 (C_3 L_3 R_3 g_m + C_L L_3 R_L g_m + C_L L_L R_3 g_m) + s (C_L R_3 R_L g_m + L_3 g_m)}{C_3 C_L L_3 L_L s^4 + s^3 (C_3 C_L L_3 R_3 + C_3 C_L L_3 R_L) + s^2 (C_3 L_3 + C_L L_3 + C_L L_L) + s (C_L R_3 + C_L R_L) + 1}$$

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

$$H(s) = \frac{C_3 L_3 L_L R_3 R_L g_m s^3 + L_3 L_L R_L g_m s^2 + L_L R_3 R_L g_m s}{C_3 C_L L_3 L_L R_3 R_L s^4 + R_3 R_L + s^3 (C_3 L_3 L_L R_3 + C_3 L_3 L_L R_L + C_L L_3 L_L R_L) + s^2 (C_3 L_3 R_3 R_L + C_L L_L R_3 R_L + L_3 L_L) + s (L_3 R_L + L_L R_3 + L_L R_L)}$$

10.67 INVALID-ORDER-67 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L R_3 R_L g_m s^4 + R_3 R_L g_m + s^3 (C_3 L_3 L_L R_3 g_m + C_L L_3 L_L R_L g_m) + s^2 (C_3 L_3 R_3 R_L g_m + C_L L_L R_3 R_L g_m + L_3 L_L g_m) + s (L_3 R_L g_m + L_L R_3 g_m)}{R_3 + R_L + s^4 (C_3 C_L L_3 L_L R_3 + C_3 C_L L_3 L_L R_L) + s^3 (C_3 L_3 L_L + C_L L_3 L_L) + s^2 (C_3 L_3 R_3 + C_3 L_3 R_L + C_L L_L R_3 + C_L L_L R_L) + s (L_3 + L_L)}$$

10.68 INVALID-ORDER-68 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_3 C_L L_3 L_L R_3 R_L g_m s^4 + C_L L_3 L_L R_L g_m s^3 + L_3 R_L g_m s + R_3 R_L g_m + s^2 (C_3 L_3 R_3 R_L g_m + C_L L_L R_3 R_L g_m)}{R_3 + R_L + s^4 (C_3 C_L L_3 L_L R_3 + C_3 C_L L_3 L_L R_L) + s^3 (C_3 C_L L_3 R_3 R_L + C_L L_3 L_L) + s^2 (C_3 L_3 R_3 + C_3 L_3 R_L + C_L L_3 R_L + C_L L_L R_3 + C_L L_L R_L) + s (C_L R_3 R_L + L_3)}$$

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

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

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

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

10.71 INVALID-ORDER-71 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_3 C_L L_3 R_3 R_L g_m s^3 + C_3 L_3 R_3 g_m s^2 + C_L R_3 R_L g_m s + R_3 g_m}{s^3 (C_3 C_L L_3 R_3 + C_3 C_L L_3 R_L) + s^2 (C_3 C_L R_3 R_L + C_3 L_3) + s (C_3 R_3 + C_L R_3 + C_L R_L) + 1}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

10.73 INVALID-ORDER-73 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{C_3L_3L_LR_3g_ms^3 + L_LR_3g_ms}{C_3C_LL_3L_LR_3s^4 + C_3L_3L_Ls^3 + L_Ls + R_3 + s^2\left(C_3L_3R_3 + C_3L_LR_3 + C_LL_LR_3\right)}$$

10.74 INVALID-ORDER-74 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \infty,\ \infty,\ L_Ls + R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3C_LL_3L_LR_3g_ms^4 + C_3C_LL_3R_3R_Lg_ms^3 + C_LR_3R_Lg_ms + R_3g_m + s^2\left(C_3L_3R_3g_m + C_LL_LR_3g_m\right)}{C_3C_LL_3L_Ls^4 + s^3\left(C_3C_LL_3R_3 + C_3C_LL_3R_L + C_3C_LL_LR_3\right) + s^2\left(C_3C_LR_3R_L + C_3L_3 + C_LL_L\right) + s\left(C_3R_3 + C_LR_3 + C_LR_L\right) + 1}$$

10.75 INVALID-ORDER-75 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_LR_Ls}{C_LL_LR_Ls^2+L_Ls+R_L}\right)$

$$H(s) = \frac{C_3L_3L_LR_3R_Lg_ms^3 + L_LR_3R_Lg_ms}{C_3C_LL_3L_LR_3R_Ls^4 + R_3R_L + s^3\left(C_3L_3L_LR_3 + C_3L_3L_LR_L\right) + s^2\left(C_3L_3R_3R_L + C_3L_LR_3R_L + C_LL_LR_3R_L\right) + s\left(L_LR_3 + L_LR_L\right)}$$

10.76 INVALID-ORDER-76 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1} + R_L\right)$

$$H(s) = \frac{C_3C_LL_3L_LR_3R_Lg_ms^4 + C_3L_3L_LR_3g_ms^3 + L_LR_3g_ms + R_3R_Lg_m + s^2\left(C_3L_3R_3R_Lg_m + C_LL_LR_3R_Lg_m\right)}{R_3 + R_L + s^4\left(C_3C_LL_3L_LR_3 + C_3C_LL_3L_LR_L\right) + s^3\left(C_3C_LL_LR_3R_L + C_3L_3L_L\right) + s^2\left(C_3L_3R_3 + C_3L_3R_L + C_3L_LR_3 + C_LL_LR_3 + C_LL_LR_L\right) + s\left(C_3R_3R_L + L_L\right)}$$

10.77 INVALID-ORDER-77 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L\left(C_LL_Ls^2+1\right)}{C_LL_Ls^2+C_LR_Ls+1}\right)$

$$H(s) = \frac{C_3C_LL_3L_LR_3R_Lg_ms^4 + R_3R_Lg_m + s^2\left(C_3L_3R_3R_Lg_m + C_LL_LR_3R_Lg_m\right)}{R_3 + R_L + s^4\left(C_3C_LL_3L_LR_3 + C_3C_LL_3L_LR_L\right) + s^3\left(C_3C_LL_3R_3R_L + C_3C_LL_LR_3R_L\right) + s^2\left(C_3L_3R_3 + C_3L_3R_L + C_3L_LR_3 + C_LL_LR_3 + C_LL_LR_L\right) + s\left(C_3R_3R_L + C_LR_3R_L\right)}$$

11 PolynomialError