Filter Summary Report: CG,Test,simple,Z1,ZL

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Contents

1 Examined $H(z)$ for CG Test simple Z1 ZL: $\frac{Z_1 Z_L g_m}{Z_1 g_m + 1}$

$$H(z) = \frac{Z_1 Z_L g_m}{Z_1 g_m + 1}$$

2 HP

3 BP

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

$$H(s) = \frac{L_L R_1 R_L g_m s}{R_1 R_L g_m + R_L + s^2 \left(C_L L_L R_1 R_L g_m + C_L L_L R_L\right) + s \left(L_L R_1 g_m + L_L\right)}$$

Parameters:

Q: $C_L R_L \sqrt{\frac{1}{C_L L_L}}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{1}{C_L R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_1 R_L g_m}{R_1 g_m + 1}$
Qz: 0
Wz: None

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

$$H(s) = \frac{L_1 R_L g_m s}{C_L L_1 R_L g_m s^2 + s \left(C_L R_L + L_1 g_m\right) + 1}$$

Parameters:

Q: $\frac{C_L L_1 R_L g_m \sqrt{\frac{1}{C_L L_1 R_L g_m}}}{C_L R_L + L_1 g_m}$
wo: $\sqrt{\frac{1}{C_L L_1 R_L g_m}}$
bandwidth: $\frac{C_L R_L + L_1 g_m}{C_L L_1 R_L g_m}$
K-LP: 0
K-HP: 0
K-BP: $\frac{L_1 R_L g_m}{C_L R_L + L_1 g_m}$
Qz: 0
Wz: None

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

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

Parameters:

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

Wz: None

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

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

Parameters:

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

4 LP

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

$$H(s) = \frac{R_L g_m}{C_1 C_L R_L s^2 + g_m + s\left(C_1 + C_L R_L g_m\right)}$$

Parameters:

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

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

$$H(s) = \frac{R_1 R_L g_m}{C_1 C_L R_1 R_L s^2 + R_1 g_m + s\left(C_1 R_1 + C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

Parameters:

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

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

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

Parameters:

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

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

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

Parameters:

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

5 BS

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

$$H(s) = \frac{C_L L_L R_1 R_L g_m s^2 + R_1 R_L g_m}{R_1 g_m + s^2\left(C_L L_L R_1 g_m + C_L L_L\right) + s\left(C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

Parameters:

Q: $\frac{L_L\sqrt{\frac{1}{C_L L_L}}}{R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_L}{L_L}$
K-LP: $\frac{R_1 R_L g_m}{R_1 g_m+1}$
K-HP: $\frac{R_1 R_L g_m}{R_1 g_m+1}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

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

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

Parameters:

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

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

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

Parameters:

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

6 GE

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

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

Parameters:

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

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

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

Parameters:

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

7 AP

8 INVALID-NUMER

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

$$H(s) = \frac{C_1 R_1 R_L g_m s + R_L g_m}{g_m + s^2 \left(C_1 C_L R_1 R_L g_m + C_1 C_L R_L\right) + s \left(C_1 R_1 g_m + C_1 + C_L R_L g_m\right)}$$

Parameters:

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

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

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

Parameters:

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

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

$$H(s) = \frac{C_L L_1 R_1 R_L g_m s + L_1 R_1 g_m}{C_1 C_L L_1 R_1 s^2 + C_L R_1 + s\left(C_L L_1 R_1 g_m + C_L L_1\right)}$$

Parameters:

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

9 INVALID-WZ

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

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

Parameters:

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

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

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

Parameters:

Q: $\frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$
wo: $\sqrt{\frac{1}{C_1 L_1}}$
bandwidth: $\frac{g_m}{C_1}$
K-LP: $\frac{L_1 g_m}{C_L}$
K-HP: $\frac{L_L g_m}{C_1}$
K-BP: R_L
Qz: $\frac{L_L \sqrt{\frac{1}{C_1 L_1}}}{R_L}$
Wz: $\sqrt{\frac{1}{C_L L_L}}$

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

$$H(s) = \frac{C_L L_1 L_L R_1 g_m s^2 + L_1 R_1 g_m}{C_1 C_L L_1 R_1 s^2 + C_L R_1 + s\left(C_L L_1 R_1 g_m + C_L L_1\right)}$$

Parameters:

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

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

$$H(s) = \frac{C_L L_1 L_L R_1 g_m s^2 + C_L L_1 R_1 R_L g_m s + L_1 R_1 g_m}{C_1 C_L L_1 R_1 s^2 + C_L R_1 + s\left(C_L L_1 R_1 g_m + C_L L_1\right)}$$

Parameters:

Q: $\frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1}$
wo: $\sqrt{\frac{1}{C_1 L_1}}$
bandwidth: $\frac{R_1 g_m + 1}{C_1 R_1}$
K-LP: $\frac{L_1 g_m}{C_L}$
K-HP: $\frac{L_L g_m}{C_1}$
K-BP: $\frac{R_1 R_L g_m}{R_1 g_m + 1}$
Qz: $\frac{L_L \sqrt{\frac{1}{C_1 L_1}}}{R_L}$
Wz: $\sqrt{\frac{1}{C_L L_L}}$

10 INVALID-ORDER

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

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

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

$$H(s) = \frac{R_1 g_m}{s\left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{R_1 R_L g_m}{R_1 g_m + s\left(C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_L R_1 R_L g_m s + R_1 g_m}{s\left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_L L_L R_1 g_m s^2 + R_1 g_m}{s\left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{L_L R_1 g_m s}{R_1 g_m + s^2\left(C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_L R_1 g_m s^2 + C_L R_1 R_L g_m s + R_1 g_m}{s\left(C_L R_1 g_m + C_L\right)}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_L L_L R_1 R_L g_m s^2 + L_L R_1 g_m s + R_1 R_L g_m}{R_1 g_m + s^2\left(C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ R_L\right)$

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

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

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

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

$$H(s) = \frac{C_L L_1 R_L g_m s + L_1 g_m}{C_L L_1 g_m s + C_L}$$

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

$$H(s) = \frac{C_L L_1 L_L g_m s^2 + L_1 g_m}{C_L L_1 g_m s + C_L}$$

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

$$H(s) = \frac{L_1 L_L g_m s^2}{C_L L_1 L_L g_m s^3 + C_L L_L s^2 + L_1 g_m s + 1}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_1 L_L g_m s^2 + C_L L_1 R_L g_m s + L_1 g_m}{C_L L_1 g_m s + C_L}$$

10.15 INVALID-ORDER-15 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L}\right)$

$$H(s) = \frac{L_1 L_L R_L g_m s^2}{C_L L_1 L_L R_L g_m s^3 + R_L + s^2 (C_L L_L R_L + L_1 L_L g_m) + s (L_1 R_L g_m + L_L)}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

$$H(s) = \frac{C_L L_1 L_L R_L g_m s^3 + L_1 L_L g_m s^2 + L_1 R_L g_m s}{C_L L_1 L_L g_m s^3 + C_L L_L s^2 + L_1 g_m s + 1}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(L_1 s,\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2 + 1\right)}{C_L L_L s^2 + C_L R_L s + 1}\right)$

$$H(s) = \frac{C_L L_1 L_L R_L g_m s^3 + L_1 R_L g_m s}{C_L L_1 L_L g_m s^3 + s^2 (C_L L_1 R_L g_m + C_L L_L) + s (C_L R_L + L_1 g_m) + 1}$$

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

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

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

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

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

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

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

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

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

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

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

$$H(s) = \frac{C_L L_L g_m s^2 + C_L R_L g_m s + g_m}{C_1 C_L s^2 + C_L g_m s}$$

10.24 INVALID-ORDER-24 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L}\right)$

$$H(s) = \frac{L_L R_L g_m s}{C_1 C_L L_L R_L s^3 + R_L g_m + s^2 \left(C_1 L_L + C_L L_L R_L g_m\right) + s \left(C_1 R_L + L_L g_m\right)}$$

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

$$H(s) = \frac{C_L L_L R_L g_m s^2 + L_L g_m s + R_L g_m}{C_1 C_L L_L s^3 + C_1 s + C_L L_L g_m s^2 + g_m}$$

10.26 INVALID-ORDER-26 $Z(s) = \left(\frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2 + 1\right)}{C_L L_L s^2 + C_L R_L s + 1}\right)$

$$H(s) = \frac{C_L L_L R_L g_m s^2 + R_L g_m}{C_1 C_L L_L s^3 + g_m + s^2 \left(C_1 C_L R_L + C_L L_L g_m\right) + s \left(C_1 + C_L R_L g_m\right)}$$

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

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

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

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

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

$$H(s) = \frac{C_L R_1 R_L g_m s + R_1 g_m}{C_1 C_L R_1 s^2 + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_L L_L R_1 g_m s^2 + R_1 g_m}{C_1 C_L R_1 s^2 + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{L_L R_1 g_m s}{C_1 C_L L_L R_1 s^3 + C_1 R_1 s + R_1 g_m + s^2 \left(C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_L L_L R_1 g_m s^2 + C_L R_1 R_L g_m s + R_1 g_m}{C_1 C_L R_1 s^2 + s \left(C_L R_1 g_m + C_L\right)}$$

10.33 INVALID-ORDER-33 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L}\right)$

$$H(s) = \frac{L_L R_1 R_L g_m s}{C_1 C_L L_L R_1 R_L s^3 + R_1 R_L g_m + R_L + s^2 \left(C_1 L_L R_1 + C_L L_L R_1 R_L g_m + C_L L_L R_L\right) + s \left(C_1 R_1 R_L + L_L R_1 g_m + L_L\right)}$$

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

$$H(s) = \frac{C_L L_L R_1 R_L g_m s^2 + L_L R_1 g_m s + R_1 R_L g_m}{C_1 C_L L_L R_1 s^3 + C_1 R_1 s + R_1 g_m + s^2 \left(C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_L L_L R_1 R_L g_m s^2 + R_1 R_L g_m}{C_1 C_L L_L R_1 s^3 + R_1 g_m + s^2 \left(C_1 C_L R_1 R_L + C_L L_L R_1 g_m + C_L L_L\right) + s \left(C_1 R_1 + C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_1 R_1 R_L g_m s + R_L g_m}{g_m + s \left(C_1 R_1 g_m + C_1\right)}$$

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

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

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

$$H(s) = \frac{C_1 C_L R_1 R_L g_m s^2 + g_m + s \left(C_1 R_1 g_m + C_L R_L g_m\right)}{C_L g_m s + s^2 \left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 C_L L_L R_1 g_m s^3 + C_1 R_1 g_m s + C_L L_L g_m s^2 + g_m}{C_L g_m s + s^2 \left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 L_L R_1 g_m s^2 + L_L g_m s}{C_L L_L g_m s^2 + g_m + s^3 \left(C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

10.41 INVALID-ORDER-41 $Z(s) = \left(R_1 + \frac{1}{C_1 s},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_1 C_L L_L R_1 g_m s^3 + g_m + s^2 \left(C_1 C_L R_1 R_L g_m + C_L L_L g_m\right) + s \left(C_1 R_1 g_m + C_L R_L g_m\right)}{C_L g_m s + s^2 \left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 L_L R_1 R_L g_m s^2 + L_L R_L g_m s}{R_L g_m + s^3 \left(C_1 C_L L_L R_1 R_L g_m + C_1 C_L L_L R_L\right) + s^2 \left(C_1 L_L R_1 g_m + C_1 L_L + C_L L_L R_L g_m\right) + s \left(C_1 R_1 R_L g_m + C_1 R_L + L_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_L R_1 R_L g_m s^3 + R_L g_m + s^2 \left(C_1 L_L R_1 g_m + C_L L_L R_L g_m\right) + s \left(C_1 R_1 R_L g_m + L_L g_m\right)}{C_L L_L g_m s^2 + g_m + s^3 \left(C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

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

$$H(s) = \frac{C_1 C_L L_L R_1 R_L g_m s^3 + C_1 R_1 R_L g_m s + C_L L_L R_L g_m s^2 + R_L g_m}{g_m + s^3\left(C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s^2\left(C_1 C_L R_1 R_L g_m + C_1 C_L R_L + C_L L_L g_m\right) + s\left(C_1 R_1 g_m + C_1 + C_L R_L g_m\right)}$$

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

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

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

$$H(s) = \frac{C_1 L_1 R_L g_m s^2 + R_L g_m}{C_1 C_L L_1 R_L g_m s^3 + g_m + s^2\left(C_1 C_L R_L + C_1 L_1 g_m\right) + s\left(C_1 + C_L R_L g_m\right)}$$

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

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

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

$$H(s) = \frac{C_1 C_L L_1 L_L g_m s^4 + g_m + s^2\left(C_1 L_1 g_m + C_L L_L g_m\right)}{C_1 C_L L_1 g_m s^3 + C_1 C_L s^2 + C_L g_m s}$$

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

$$H(s) = \frac{C_1 L_1 L_L g_m s^3 + L_L g_m s}{C_1 C_L L_1 L_L g_m s^4 + C_1 C_L L_L s^3 + C_1 s + g_m + s^2\left(C_1 L_1 g_m + C_L L_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L g_m s^4 + C_1 C_L L_1 R_L g_m s^3 + C_L R_L g_m s + g_m + s^2\left(C_1 L_1 g_m + C_L L_L g_m\right)}{C_1 C_L L_1 g_m s^3 + C_1 C_L s^2 + C_L g_m s}$$

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

$$H(s) = \frac{C_1 L_1 L_L R_L g_m s^3 + L_L R_L g_m s}{C_1 C_L L_1 L_L R_L g_m s^4 + R_L g_m + s^3\left(C_1 C_L L_L R_L + C_1 L_1 L_L g_m\right) + s^2\left(C_1 L_1 R_L g_m + C_1 L_L + C_L L_L R_L g_m\right) + s\left(C_1 R_L + L_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_L g_m s^4 + C_1 L_1 L_L g_m s^3 + L_L g_m s + R_L g_m + s^2\left(C_1 L_1 R_L g_m + C_L L_L R_L g_m\right)}{C_1 C_L L_1 L_L g_m s^4 + C_1 C_L L_L s^3 + C_1 s + g_m + s^2\left(C_1 L_1 g_m + C_L L_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_L g_m s^4 + R_L g_m + s^2\left(C_1 L_1 R_L g_m + C_L L_L R_L g_m\right)}{C_1 C_L L_1 L_L g_m s^4 + g_m + s^3\left(C_1 C_L L_1 R_L g_m + C_1 C_L L_L\right) + s^2\left(C_1 C_L R_L + C_1 L_1 g_m + C_L L_L g_m\right) + s\left(C_1 + C_L R_L g_m\right)}$$

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

$$H(s) = \frac{L_1 R_L g_m s}{C_1 C_L L_1 R_L s^3 + s^2\left(C_1 L_1 + C_L L_1 R_L g_m\right) + s\left(C_L R_L + L_1 g_m\right) + 1}$$

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

$$H(s) = \frac{L_1 L_L g_m s^2}{C_1 C_L L_1 L_L s^4 + C_L L_1 L_L g_m s^3 + L_1 g_m s + s^2\left(C_1 L_1 + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{L_1 L_L R_L g_m s^2}{C_1 C_L L_1 L_L R_L s^4 + R_L + s^3\left(C_1 L_1 L_L + C_L L_1 L_L R_L g_m\right) + s^2\left(C_1 L_1 R_L + C_L L_L R_L + L_1 L_L g_m\right) + s\left(L_1 R_L g_m + L_L\right)}$$

10.57 INVALID-ORDER-57 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{C_L L_1 L_L R_L g_m s^3 + L_1 L_L g_m s^2 + L_1 R_L g_m s}{C_1 C_L L_1 L_L s^4 + C_L L_1 L_L g_m s^3 + L_1 g_m s + s^2\left(C_1 L_1 + C_L L_L\right) + 1}$$

10.58 INVALID-ORDER-58 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_L L_1 L_L R_L g_m s^3 + L_1 R_L g_m s}{C_1 C_L L_1 L_L s^4 + s^3\left(C_1 C_L L_1 R_L + C_L L_1 L_L g_m\right) + s^2\left(C_1 L_1 + C_L L_1 R_L g_m + C_L L_L\right) + s\left(C_L R_L + L_1 g_m\right) + 1}$$

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

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

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

$$H(s) = \frac{C_1 L_1 R_L g_m s^2 + C_1 R_1 R_L g_m s + R_L g_m}{C_1 C_L L_1 R_L g_m s^3 + g_m + s^2\left(C_1 C_L R_1 R_L g_m + C_1 C_L R_L + C_1 L_1 g_m\right) + s\left(C_1 R_1 g_m + C_1 + C_L R_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 R_L g_m s^3 + g_m + s^2\left(C_1 C_L R_1 R_L g_m + C_1 L_1 g_m\right) + s\left(C_1 R_1 g_m + C_L R_L g_m\right)}{C_1 C_L L_1 g_m s^3 + C_L g_m s + s^2\left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L g_m s^4 + C_1 C_L L_L R_1 g_m s^3 + C_1 R_1 g_m s + g_m + s^2 \left(C_1 L_1 g_m + C_L L_L g_m\right)}{C_1 C_L L_1 g_m s^3 + C_L g_m s + s^2 \left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 L_1 L_L g_m s^3 + C_1 L_L R_1 g_m s^2 + L_L g_m s}{C_1 C_L L_1 L_L g_m s^4 + g_m + s^3 \left(C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s^2 \left(C_1 L_1 g_m + C_L L_L g_m\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L g_m s^4 + g_m + s^3 \left(C_1 C_L L_1 R_L g_m + C_1 C_L L_L R_1 g_m\right) + s^2 \left(C_1 C_L R_1 R_L g_m + C_1 L_1 g_m + C_L L_L g_m\right) + s \left(C_1 R_1 g_m + C_L R_L g_m\right)}{C_1 C_L L_1 g_m s^3 + C_L g_m s + s^2 \left(C_1 C_L R_1 g_m + C_1 C_L\right)}$$

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

$$H(s) = \frac{C_1 L_1 L_L R_L g_m s^3 + C_1 L_L R_1 R_L g_m s^2 + L_L R_L g_m s}{C_1 C_L L_1 L_L R_L g_m s^4 + R_L g_m + s^3 \left(C_1 C_L L_L R_1 R_L g_m + C_1 C_L L_L R_L + C_1 L_1 L_L g_m\right) + s^2 \left(C_1 L_1 R_L g_m + C_1 L_L R_1 g_m + C_1 L_L + C_L L_L R_L g_m\right) + s \left(C_1 R_1 R_L g_m + C_1 R_L + L_L g_m\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_L g_m s^4 + R_L g_m + s^3 \left(C_1 C_L L_L R_1 R_L g_m + C_1 L_1 L_L g_m\right) + s^2 \left(C_1 L_1 R_L g_m + C_1 L_L R_1 g_m + C_L L_L R_L g_m\right) + s \left(C_1 R_1 R_L g_m + L_L g_m\right)}{C_1 C_L L_1 L_L g_m s^4 + g_m + s^3 \left(C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s^2 \left(C_1 L_1 g_m + C_L L_L g_m\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_L g_m s^4 + C_1 C_L L_L R_1 R_L g_m s^3 + C_1 R_1 R_L g_m s + R_L g_m + s^2 \left(C_1 L_1 R_L g_m + C_L L_L R_L g_m\right)}{C_1 C_L L_1 L_L g_m s^4 + g_m + s^3 \left(C_1 C_L L_1 R_L g_m + C_1 C_L L_L R_1 g_m + C_1 C_L L_L\right) + s^2 \left(C_1 C_L R_1 R_L g_m + C_1 C_L R_L + C_1 L_1 g_m + C_L L_L g_m\right) + s \left(C_1 R_1 g_m + C_1 + C_L R_L g_m\right)}$$

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

$$H(s) = \frac{L_1 R_1 R_L g_m s}{C_1 C_L L_1 R_1 R_L s^3 + R_1 + s^2 \left(C_1 L_1 R_1 + C_L L_1 R_1 R_L g_m + C_L L_1 R_L\right) + s \left(C_L R_1 R_L + L_1 R_1 g_m + L_1\right)}$$

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

$$H(s) = \frac{L_1 L_L R_1 g_m s^2}{C_1 C_L L_1 L_L R_1 s^4 + R_1 + s^3 \left(C_L L_1 L_L R_1 g_m + C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 + C_L L_L R_1\right) + s \left(L_1 R_1 g_m + L_1\right)}$$

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

$$H(s) = \frac{L_1 L_L R_1 R_L g_m s^2}{C_1 C_L L_1 L_L R_1 R_L s^4 + R_1 R_L + s^3 \left(C_1 L_1 L_L R_1 + C_L L_1 L_L R_1 R_L g_m + C_L L_1 L_L R_L\right) + s^2 \left(C_1 L_1 R_1 R_L + C_L L_L R_1 R_L + L_1 L_L R_1 g_m + L_1 L_L\right) + s \left(L_1 R_1 R_L g_m + L_1 R_L + L_L R_1\right)}$$

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

$$H(s) = \frac{C_L L_1 L_L R_1 R_L g_m s^3 + L_1 L_L R_1 g_m s^2 + L_1 R_1 R_L g_m s}{C_1 C_L L_1 L_L R_1 s^4 + R_1 + s^3 \left(C_L L_1 L_L R_1 g_m + C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 + C_L L_L R_1\right) + s \left(L_1 R_1 g_m + L_1\right)}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2+L_1 s+R_1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1}\right)$

$$H(s) = \frac{C_L L_1 L_L R_1 R_L g_m s^3 + L_1 R_1 R_L g_m s}{C_1 C_L L_1 L_L R_1 s^4 + R_1 + s^3 \left(C_1 C_L L_1 R_1 R_L + C_L L_1 L_L R_1 g_m + C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 + C_L L_1 R_1 R_L g_m + C_L L_1 R_L + C_L L_L R_1\right) + s \left(C_L R_1 R_L + L_1 R_1 g_m + L_1\right)}$$

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

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

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

$$H(s) = \frac{C_1 L_1 R_1 R_L g_m s^2 + L_1 R_L g_m s + R_1 R_L g_m}{R_1 g_m + s^3 \left(C_1 C_L L_1 R_1 R_L g_m + C_1 C_L L_1 R_L\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_1 R_L g_m\right) + s \left(C_L R_1 R_L g_m + C_L R_L + L_1 g_m\right) + 1}$$

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

$$H(s) = \frac{C_1 C_L L_1 R_1 R_L g_m s^3 + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_L L_1 R_L g_m\right) + s \left(C_L R_1 R_L g_m + L_1 g_m\right)}{C_L L_1 g_m s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 g_m s^4 + C_L L_1 L_L g_m s^3 + L_1 g_m s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_L L_L R_1 g_m\right)}{C_L L_1 g_m s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_1 L_1 L_L R_1 g_m s^3 + L_1 L_L g_m s^2 + L_L R_1 g_m s}{C_L L_1 L_L g_m s^3 + L_1 g_m s + R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 g_m s^4 + R_1 g_m + s^3 \left(C_1 C_L L_1 R_1 R_L g_m + C_L L_1 L_L g_m\right) + s^2 \left(C_1 L_1 R_1 g_m + C_L L_1 R_L g_m + C_L L_L R_1 g_m\right) + s \left(C_L R_1 R_L g_m + L_1 g_m\right)}{C_L L_1 g_m s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_1 L_1 L_L R_1 R_L g_m s^3 + L_1 L_L R_L g_m s^2 + L_L R_1 R_L g_m s}{R_1 R_L g_m + R_L + s^4 \left(C_1 C_L L_1 L_L R_1 R_L g_m + C_1 C_L L_1 L_L R_L\right) + s^3 \left(C_1 L_1 L_L R_1 g_m + C_1 L_1 L_L + C_L L_1 L_L R_L g_m\right) + s^2 \left(C_1 L_1 R_1 R_L g_m + C_1 L_1 R_L + C_L L_L R_1 R_L g_m + C_L L_L R_L + L_1 L_L g_m\right) + s \left(L_1 R_L g_m + L_L R_1 g_m + L_L\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 R_L g_m s^4 + R_1 R_L g_m + s^3 \left(C_1 L_1 L_L R_1 g_m + C_L L_1 L_L R_L g_m\right) + s^2 \left(C_1 L_1 R_1 R_L g_m + C_L L_L R_1 R_L g_m + L_1 L_L g_m\right) + s \left(L_1 R_L g_m + L_L R_1 g_m\right)}{C_L L_1 L_L g_m s^3 + L_1 g_m s + R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 R_L g_m s^4 + C_L L_1 L_L R_L g_m s^3 + L_1 R_L g_m s + R_1 R_L g_m + s^2 \left(C_1 L_1 R_1 R_L g_m + C_L L_L R_1 R_L g_m\right)}{R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^3 \left(C_1 C_L L_1 R_1 R_L g_m + C_1 C_L L_1 R_L + C_L L_1 L_L g_m\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_1 R_L g_m + C_L L_L R_1 g_m + C_L L_L\right) + s \left(C_L R_1 R_L g_m + C_L R_L + L_1 g_m\right) + 1}$$

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

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

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

$$H(s) = \frac{C_1 L_1 R_1 R_L g_m s^2 + R_1 R_L g_m}{R_1 g_m + s^3 \left(C_1 C_L L_1 R_1 R_L g_m + C_1 C_L L_1 R_L\right) + s^2 \left(C_1 C_L R_1 R_L + C_1 L_1 R_1 g_m + C_1 L_1\right) + s \left(C_1 R_1 + C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

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

$$H(s) = \frac{C_1 C_L L_1 R_1 R_L g_m s^3 + C_1 L_1 R_1 g_m s^2 + C_L R_1 R_L g_m s + R_1 g_m}{C_1 C_L R_1 s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 R_L g_m s^4 + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_L L_L R_1 g_m\right)}{C_1 C_L R_1 s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

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

$$H(s) = \frac{C_1 L_1 L_L R_1 g_m s^3 + L_L R_1 g_m s}{C_1 C_L L_L R_1 s^3 + C_1 R_1 s + R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

10.87 INVALID-ORDER-87 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2+1\right)}{C_1 L_1 s^2+C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 g_m s^4 + C_1 C_L L_1 R_1 R_L g_m s^3 + C_L R_1 R_L g_m s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_L L_L R_1 g_m\right)}{C_1 C_L R_1 s^2 + s^3 \left(C_1 C_L L_1 R_1 g_m + C_1 C_L L_1\right) + s \left(C_L R_1 g_m + C_L\right)}$$

10.88 INVALID-ORDER-88 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2+1\right)}{C_1 L_1 s^2+C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L R_L s}{C_L L_L R_L s^2+L_L s+R_L} \right)$

$$H(s) = \frac{C_1 L_1 L_L R_1 R_L g_m s^3 + L_L R_1 R_L g_m s}{R_1 R_L g_m + R_L + s^4 \left(C_1 C_L L_1 L_L R_1 R_L g_m + C_1 C_L L_1 L_L R_L\right) + s^3 \left(C_1 C_L L_L R_1 R_L + C_1 L_1 L_L R_1 g_m + C_1 L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 R_L g_m + C_1 L_1 R_L + C_1 L_L R_1 + C_L L_L R_1 R_L g_m + C_L L_L R_L\right) + s \left(C_1 R_1 R_L + L_L R_1 g_m + L_L\right)}$$

10.89 INVALID-ORDER-89 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2+1\right)}{C_1 L_1 s^2+C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L \right)$

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 R_L g_m s^4 + C_1 L_1 L_L R_1 g_m s^3 + L_L R_1 g_m s + R_1 R_L g_m + s^2 \left(C_1 L_1 R_1 R_L g_m + C_L L_L R_1 R_L g_m\right)}{C_1 C_L L_L R_1 s^3 + C_1 R_1 s + R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_L R_1 g_m + C_L L_L\right) + 1}$$

10.90 INVALID-ORDER-90 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2+1\right)}{C_1 L_1 s^2+C_1 R_1 s+1},\ \infty,\ \infty,\ \infty,\ \infty,\ \frac{R_L\left(C_L L_L s^2+1\right)}{C_L L_L s^2+C_L R_L s+1} \right)$

$$H(s) = \frac{C_1 C_L L_1 L_L R_1 R_L g_m s^4 + R_1 R_L g_m + s^2 \left(C_1 L_1 R_1 R_L g_m + C_L L_L R_1 R_L g_m\right)}{R_1 g_m + s^4 \left(C_1 C_L L_1 L_L R_1 g_m + C_1 C_L L_1 L_L\right) + s^3 \left(C_1 C_L L_1 R_1 R_L g_m + C_1 C_L L_1 R_L + C_1 C_L L_L R_1\right) + s^2 \left(C_1 C_L R_1 R_L + C_1 L_1 R_1 g_m + C_1 L_1 + C_L L_L R_1 g_m + C_L L_L\right) + s \left(C_1 R_1 + C_L R_1 R_L g_m + C_L R_L\right) + 1}$$

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