Filter Summary Report: CG,TIA,simple,Z1,Z3

Generated by MacAnalog-Symbolix

January 17, 2025

Contents

11 PolynomialError

1 Examined $H(z)$ for CG TIA simple Z1 Z3: $\frac{Z_1 Z_3 g_m}{Z_1 g_m + 1}$

$$H(z) = \frac{Z_1 Z_3 g_m}{Z_1 g_m + 1}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(R_1, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_3 R_1 R_3 g_m s}{R_1 R_3 g_m + R_3 + s^2 \left(C_3 L_3 R_1 R_3 g_m + C_3 L_3 R_3 \right) + s \left(L_3 R_1 g_m + L_3 \right)}$$

Parameters:

Q: $C_3 R_3 \sqrt{\frac{1}{C_3 L_3}}$

wo: $\sqrt{\frac{1}{C_3 L_3}}$

bandwidth: $\frac{1}{C_3 R_3}$

K-LP: 0

K-HP: 0

K-BP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

Qz: None

Wz: None

3.2 BP-2 $Z(s) = \left(L_1 s, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 R_3 g_m s}{C_3 L_1 R_3 g_m s^2 + s \left(C_3 R_3 + L_1 g_m \right) + 1}$$

Parameters:

Q: $\frac{C_3 L_1 R_3 g_m \sqrt{\frac{1}{C_3 L_1 R_3 g_m}}}{C_3 R_3 + L_1 g_m}$

wo: $\sqrt{\frac{1}{C_3 L_1 R_3 g_m}}$

bandwidth: $\frac{C_3 R_3 + L_1 g_m}{C_3 L_1 R_3 g_m}$

K-LP: 0

K-HP: 0

K-BP: $\frac{L_1 R_3 g_m}{C_3 R_3 + L_1 g_m}$

Qz: None

Wz: None

3.3 BP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 R_3 g_m s}{C_1 L_1 s^2 + L_1 g_m s + 1}$$

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_3

Qz: None

3.4 BP-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 R_1 R_3 g_m s}{C_1 L_1 R_1 s^2 + R_1 + s\left(L_1 R_1 g_m + L_1\right)}$$

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: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

Qz: None

Wz: None

4 LP

4.1 LP-1 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_3 g_m}{C_1 C_3 R_3 s^2 + g_m + s\left(C_1 + C_3 R_3 g_m\right)}$$

Parameters:

Q: $\frac{C_1 C_3 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_3}}}{C_1 + C_3 R_3 g_m}$

wo: $\sqrt{\frac{g_m}{C_1 C_3 R_3}}$

bandwidth: $\frac{C_1 + C_3 R_3 g_m}{C_1 C_3 R_3}$

K-LP: R_3

K-HP: 0

K-BP: 0

Qz: None

Wz: None

4.2 LP-2 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 R_3 g_m}{C_1 C_3 R_1 R_3 s^2 + R_1 g_m + s\left(C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3\right) + 1}$$

Parameters:

Q: $\frac{C_1 C_3 R_1 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_3} + \frac{1}{C_1 C_3 R_1 R_3}}}{C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3}$

wo: $\sqrt{\frac{R_1 g_m + 1}{C_1 C_3 R_1 R_3}}$

bandwidth: $\frac{\sqrt{\frac{R_1 g_m + 1}{C_1 C_3 R_1 R_3}}\left(C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3\right)}{C_1 C_3 R_1 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_3} + \frac{1}{C_1 C_3 R_1 R_3}}}$

K-LP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-HP: 0

K-BP: 0

Qz: None

Wz: None

4.3 LP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 g_m}{C_1 C_3 L_1 s^2 + C_3 L_1 g_m s + C_3}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: 0

K-BP: 0

Qz: None

Wz: None

4.4 LP-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 R_1 g_m}{C_1 C_3 L_1 R_1 s^2 + C_3 R_1 + s \left(C_3 L_1 R_1 g_m + C_3 L_1 \right)}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: 0

K-BP: 0

Qz: None

Wz: None

5 BS

5.1 BS-1 $Z(s) = \left(R_1, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1 \right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_1 R_3 g_m s^2 + R_1 R_3 g_m}{R_1 g_m + s^2 \left(C_3 L_3 R_1 g_m + C_3 L_3 \right) + s \left(C_3 R_1 R_3 g_m + C_3 R_3 \right) + 1}$$

Parameters:

Q: $\frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3}$

wo: $\sqrt{\frac{1}{C_3 L_3}}$

bandwidth: $\frac{R_3}{L_3}$

K-LP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-HP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-BP: 0

Qz: None

Wz: $\sqrt{\frac{1}{C_3 L_3}}$

5.2 BS-2 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_3 g_m s^2 + R_3 g_m}{C_1 L_1 g_m s^2 + C_1 s + g_m}$$

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_3

K-HP: R_3

K-BP: 0

Qz: None

Wz: $\sqrt{\frac{1}{C_1 L_1}}$

5.3 BS-3 $Z(s) = \left(\frac{R_1 \left(C_1 L_1 s^2 + 1 \right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 R_3 g_m s^2 + R_1 R_3 g_m}{C_1 R_1 s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 \right) + 1}$$

Parameters:

Q: $\frac{L_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + L_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1}$

wo: $\sqrt{\frac{1}{C_1 L_1}}$

bandwidth: $\frac{R_1 \sqrt{\frac{1}{C_1 L_1}}}{L_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + L_1 \sqrt{\frac{1}{C_1 L_1}}}$

K-LP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-HP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-BP: 0

Qz: None

Wz: $\sqrt{\frac{1}{C_1 L_1}}$

6 GE

6.1 GE-1 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_3 g_m s^2 + C_1 R_1 R_3 g_m s + R_3 g_m}{C_1 L_1 g_m s^2 + g_m + s \left(C_1 R_1 g_m + C_1 \right)}$$

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_3

K-HP: R_3

K-BP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

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 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 R_3 g_m s^2 + L_1 R_3 g_m s + R_1 R_3 g_m}{L_1 g_m s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 \right) + 1}$$

Parameters:

Q: $\dfrac{C_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$

wo: $\sqrt{\frac{1}{C_1 L_1}}$

bandwidth: $\dfrac{g_m \sqrt{\frac{1}{C_1 L_1}}}{C_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + C_1 \sqrt{\frac{1}{C_1 L_1}}}$

K-LP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-HP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

K-BP: R_3

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 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 R_1 R_3 g_m s + R_3 g_m}{g_m + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3 \right) + s \left(C_1 R_1 g_m + C_1 + C_3 R_3 g_m \right)}$$

Parameters:

Q: $\dfrac{C_1 C_3 R_1 g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}} + C_1 C_3 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}}}{C_1 R_1 g_m + C_1 + C_3 R_3 g_m}$

wo: $\sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}}$

bandwidth: $\dfrac{\sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}} \left(C_1 R_1 g_m + C_1 + C_3 R_3 g_m \right)}{C_1 C_3 R_1 g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}} + C_1 C_3 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3}}}$

K-LP: R_3

K-HP: 0

K-BP: $\frac{C_1 R_1 R_3 g_m}{C_1 R_1 g_m + C_1 + C_3 R_3 g_m}$

Qz: None

Wz: None

8.2 INVALID-NUMER-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 R_3 g_m s + L_1 g_m}{C_1 C_3 L_1 s^2 + C_3 L_1 g_m s + C_3}$$

Parameters:

Q: $\dfrac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m}$

wo: $\sqrt{\frac{1}{C_1 L_1}}$

bandwidth: $\frac{g_m}{C_1}$

K-LP: $\frac{L_1 g_m}{C_3}$

K-HP: 0

K-BP: R_3

Qz: None

Wz: None

8.3 INVALID-NUMER-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 R_1 R_3 g_m s + L_1 R_1 g_m}{C_1 C_3 L_1 R_1 s^2 + C_3 R_1 + s \left(C_3 L_1 R_1 g_m + C_3 L_1 \right)}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: 0

K-BP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

Qz: None

Wz: None

9 INVALID-WZ

9.1 INVALID-WZ-1 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 g_m s^2 + L_1 g_m}{C_1 C_3 L_1 s^2 + C_3 L_1 g_m s + C_3}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: $\frac{L_3 g_m}{C_1}$

K-BP: 0

Qz: None

Wz: $\sqrt{\frac{1}{C_3 L_3}}$

9.2 INVALID-WZ-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 g_m s^2 + C_3 L_1 R_3 g_m s + L_1 g_m}{C_1 C_3 L_1 s^2 + C_3 L_1 g_m s + C_3}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: $\frac{L_3 g_m}{C_1}$

K-BP: R_3

Qz: None

Wz: $\sqrt{\frac{1}{C_3 L_3}}$

9.3 INVALID-WZ-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_1 g_m s^2 + L_1 R_1 g_m}{C_1 C_3 L_1 R_1 s^2 + C_3 R_1 + s \left(C_3 L_1 R_1 g_m + C_3 L_1 \right)}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: $\frac{L_3 g_m}{C_1}$

K-BP: 0

Qz: None

Wz: $\sqrt{\frac{1}{C_3 L_3}}$

9.4 INVALID-WZ-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_1 g_m s^2 + C_3 L_1 R_1 R_3 g_m s + L_1 R_1 g_m}{C_1 C_3 L_1 R_1 s^2 + C_3 R_1 + s \left(C_3 L_1 R_1 g_m + C_3 L_1 \right)}$$

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: $\frac{L_1 g_m}{C_3}$

K-HP: $\frac{L_3 g_m}{C_1}$

K-BP: $\frac{R_1 R_3 g_m}{R_1 g_m + 1}$

Qz: None

Wz: $\sqrt{\frac{1}{C_3 L_3}}$

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (R_1, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty)$

$$H(s) = \frac{R_1 R_3 g_m}{R_1 g_m + 1}$$

10.2 INVALID-ORDER-2 $Z(s) = \left(R_1, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 g_m}{s \left(C_3 R_1 g_m + C_3 \right)}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(R_1, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 R_3 g_m}{R_1 g_m + s \left(C_3 R_1 R_3 g_m + C_3 R_3 \right) + 1}$$

10.4 INVALID-ORDER-4 $Z(s) = \left(R_1, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 R_1 R_3 g_m s + R_1 g_m}{s\left(C_3 R_1 g_m + C_3\right)}$$

10.5 INVALID-ORDER-5 $Z(s) = \left(R_1, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_1 g_m s^2 + R_1 g_m}{s\left(C_3 R_1 g_m + C_3\right)}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(R_1, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_3 R_1 g_m s}{R_1 g_m + s^2\left(C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(R_1, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_1 g_m s^2 + C_3 R_1 R_3 g_m s + R_1 g_m}{s\left(C_3 R_1 g_m + C_3\right)}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(R_1, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_1 R_3 g_m s^2 + L_3 R_1 g_m s + R_1 R_3 g_m}{R_1 g_m + s^2\left(C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(L_1 s, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 R_3 g_m s}{L_1 g_m s + 1}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(L_1 s, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 g_m}{C_3 L_1 g_m s + C_3}$$

10.11 INVALID-ORDER-11 $Z(s) = \left(L_1 s, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_1 R_3 g_m s + L_1 g_m}{C_3 L_1 g_m s + C_3}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(L_1 s, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_1 L_3 g_m s^2 + L_1 g_m}{C_3 L_1 g_m s + C_3}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(L_1 s, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 L_3 g_m s^2}{C_3 L_1 L_3 g_m s^3 + C_3 L_3 s^2 + L_1 g_m s + 1}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(L_1 s, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 g_m s^2 + C_3 L_1 R_3 g_m s + L_1 g_m}{C_3 L_1 g_m s + C_3}$$

10.15 INVALID-ORDER-15 $Z(s) = \left(L_1 s, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 L_3 R_3 g_m s^2}{C_3 L_1 L_3 R_3 g_m s^3 + R_3 + s^2 \left(C_3 L_3 R_3 + L_1 L_3 g_m \right) + s \left(L_1 R_3 g_m + L_3 \right)}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(L_1 s, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_3 g_m s^3 + L_1 L_3 g_m s^2 + L_1 R_3 g_m s}{C_3 L_1 L_3 g_m s^3 + C_3 L_3 s^2 + L_1 g_m s + 1}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(L_1 s, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1 \right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_3 g_m s^3 + L_1 R_3 g_m s}{C_3 L_1 L_3 g_m s^3 + s^2 \left(C_3 L_1 R_3 g_m + C_3 L_3 \right) + s \left(C_3 R_3 + L_1 g_m \right) + 1}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_3 g_m}{C_1 s + g_m}$$

10.19 INVALID-ORDER-19 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{g_m}{C_1 C_3 s^2 + C_3 g_m s}$$

10.20 INVALID-ORDER-20 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 R_3 g_m s + g_m}{C_1 C_3 s^2 + C_3 g_m s}$$

10.21 INVALID-ORDER-21 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 g_m s^2 + g_m}{C_1 C_3 s^2 + C_3 g_m s}$$

10.22 INVALID-ORDER-22 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_3 g_m s}{C_1 C_3 L_3 s^3 + C_1 s + C_3 L_3 g_m s^2 + g_m}$$

10.23 INVALID-ORDER-23 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 g_m s^2 + C_3 R_3 g_m s + g_m}{C_1 C_3 s^2 + C_3 g_m s}$$

10.24 **INVALID-ORDER-24** $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_3 R_3 g_m s}{C_1 C_3 L_3 R_3 s^3 + R_3 g_m + s^2 \left(C_1 L_3 + C_3 L_3 R_3 g_m \right) + s \left(C_1 R_3 + L_3 g_m \right)}$$

10.25 **INVALID-ORDER-25** $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_3 g_m s^2 + L_3 g_m s + R_3 g_m}{C_1 C_3 L_3 s^3 + C_1 s + C_3 L_3 g_m s^2 + g_m}$$

10.26 **INVALID-ORDER-26** $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1 \right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_3 g_m s^2 + R_3 g_m}{C_1 C_3 L_3 s^3 + g_m + s^2 \left(C_1 C_3 R_3 + C_3 L_3 g_m \right) + s \left(C_1 + C_3 R_3 g_m \right)}$$

10.27 **INVALID-ORDER-27** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 R_3 g_m}{C_1 R_1 s + R_1 g_m + 1}$$

10.28 **INVALID-ORDER-28** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 g_m}{C_1 C_3 R_1 s^2 + s \left(C_3 R_1 g_m + C_3 \right)}$$

10.29 **INVALID-ORDER-29** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 R_1 R_3 g_m s + R_1 g_m}{C_1 C_3 R_1 s^2 + s \left(C_3 R_1 g_m + C_3 \right)}$$

10.30 **INVALID-ORDER-30** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_1 g_m s^2 + R_1 g_m}{C_1 C_3 R_1 s^2 + s \left(C_3 R_1 g_m + C_3 \right)}$$

10.31 **INVALID-ORDER-31** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_3 R_1 g_m s}{C_1 C_3 L_3 R_1 s^3 + C_1 R_1 s + R_1 g_m + s^2 \left(C_3 L_3 R_1 g_m + C_3 L_3 \right) + 1}$$

10.32 **INVALID-ORDER-32** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_1 g_m s^2 + C_3 R_1 R_3 g_m s + R_1 g_m}{C_1 C_3 R_1 s^2 + s \left(C_3 R_1 g_m + C_3 \right)}$$

10.33 **INVALID-ORDER-33** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_3 R_1 R_3 g_m s}{C_1 C_3 L_3 R_1 R_3 s^3 + R_1 R_3 g_m + R_3 + s^2 \left(C_1 L_3 R_1 + C_3 L_3 R_1 R_3 g_m + C_3 L_3 R_3 \right) + s \left(C_1 R_1 R_3 + L_3 R_1 g_m + L_3 \right)}$$

10.34 **INVALID-ORDER-34** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_1 R_3 g_m s^2 + L_3 R_1 g_m s + R_1 R_3 g_m}{C_1 C_3 L_3 R_1 s^3 + C_1 R_1 s + R_1 g_m + s^2 \left(C_3 L_3 R_1 g_m + C_3 L_3 \right) + 1}$$

10.35 **INVALID-ORDER-35** $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1 \right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_3 R_1 R_3 g_m s^2 + R_1 R_3 g_m}{C_1 C_3 L_3 R_1 s^3 + R_1 g_m + s^2 \left(C_1 C_3 R_1 R_3 + C_3 L_3 R_1 g_m + C_3 L_3 \right) + s \left(C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3 \right) + 1}$$

10.36 **INVALID-ORDER-36** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 R_1 R_3 g_m s + R_3 g_m}{g_m + s \left(C_1 R_1 g_m + C_1 \right)}$$

10.37 **INVALID-ORDER-37** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 R_1 g_m s + g_m}{C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3 \right)}$$

10.38 **INVALID-ORDER-38** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 R_1 R_3 g_m s^2 + g_m + s \left(C_1 R_1 g_m + C_3 R_3 g_m \right)}{C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3 \right)}$$

10.39 **INVALID-ORDER-39** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_3 R_1 g_m s^3 + C_1 R_1 g_m s + C_3 L_3 g_m s^2 + g_m}{C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3 \right)}$$

10.40 **INVALID-ORDER-40** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_3 R_1 g_m s^2 + L_3 g_m s}{C_3 L_3 g_m s^2 + g_m + s^3 \left(C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3 \right) + s \left(C_1 R_1 g_m + C_1 \right)}$$

10.41 **INVALID-ORDER-41** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_3 R_1 g_m s^3 + g_m + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_3 L_3 g_m \right) + s \left(C_1 R_1 g_m + C_3 R_3 g_m \right)}{C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3 \right)}$$

10.42 **INVALID-ORDER-42** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_3 R_1 R_3 g_m s^2 + L_3 R_3 g_m s}{R_3 g_m + s^3 \left(C_1 C_3 L_3 R_1 R_3 g_m + C_1 C_3 L_3 R_3 \right) + s^2 \left(C_1 L_3 R_1 g_m + C_1 L_3 + C_3 L_3 R_3 g_m \right) + s \left(C_1 R_1 R_3 g_m + C_1 R_3 + L_3 g_m \right)}$$

10.43 **INVALID-ORDER-43** $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_3 R_1 R_3 g_m s^3 + R_3 g_m + s^2 \left(C_1 L_3 R_1 g_m + C_3 L_3 R_3 g_m \right) + s \left(C_1 R_1 R_3 g_m + L_3 g_m \right)}{C_3 L_3 g_m s^2 + g_m + s^3 \left(C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3 \right) + s \left(C_1 R_1 g_m + C_1 \right)}$$

10.44 INVALID-ORDER-44 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_3 R_1 R_3 g_m s^3 + C_1 R_1 R_3 g_m s + C_3 L_3 R_3 g_m s^2 + R_3 g_m}{g_m + s^3 \left(C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3\right) + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3 + C_3 L_3 g_m\right) + s \left(C_1 R_1 g_m + C_1 + C_3 R_3 g_m\right)}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 g_m s^2 + g_m}{C_1 C_3 L_1 g_m s^3 + C_1 C_3 s^2 + C_3 g_m s}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 R_3 g_m s^2 + R_3 g_m}{C_1 C_3 L_1 R_3 g_m s^3 + g_m + s^2 \left(C_1 C_3 R_3 + C_1 L_1 g_m\right) + s \left(C_1 + C_3 R_3 g_m\right)}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 R_3 g_m s^3 + C_1 L_1 g_m s^2 + C_3 R_3 g_m s + g_m}{C_1 C_3 L_1 g_m s^3 + C_1 C_3 s^2 + C_3 g_m s}$$

10.48 INVALID-ORDER-48 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right)}{C_1 C_3 L_1 g_m s^3 + C_1 C_3 s^2 + C_3 g_m s}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 L_3 g_m s^3 + L_3 g_m s}{C_1 C_3 L_1 L_3 g_m s^4 + C_1 C_3 L_3 s^3 + C_1 s + g_m + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 g_m s^4 + C_1 C_3 L_1 R_3 g_m s^3 + C_3 R_3 g_m s + g_m + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right)}{C_1 C_3 L_1 g_m s^3 + C_1 C_3 s^2 + C_3 g_m s}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 L_3 R_3 g_m s^3 + L_3 R_3 g_m s}{C_1 C_3 L_1 L_3 R_3 g_m s^4 + R_3 g_m + s^3 \left(C_1 C_3 L_3 R_3 + C_1 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 R_3 g_m + C_1 L_3 + C_3 L_3 R_3 g_m\right) + s \left(C_1 R_3 + L_3 g_m\right)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_3 g_m s^4 + C_1 L_1 L_3 g_m s^3 + L_3 g_m s + R_3 g_m + s^2 \left(C_1 L_1 R_3 g_m + C_3 L_3 R_3 g_m\right)}{C_1 C_3 L_1 L_3 g_m s^4 + C_1 C_3 L_3 s^3 + C_1 s + g_m + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right)}$$

10.53 **INVALID-ORDER-53** $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_3 g_m s^4 + R_3 g_m + s^2 \left(C_1 L_1 R_3 g_m + C_3 L_3 R_3 g_m\right)}{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^3 \left(C_1 C_3 L_1 R_3 g_m + C_1 C_3 L_3\right) + s^2 \left(C_1 C_3 R_3 + C_1 L_1 g_m + C_3 L_3 g_m\right) + s \left(C_1 + C_3 R_3 g_m\right)}$$

10.54 **INVALID-ORDER-54** $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 R_3 g_m s}{C_1 C_3 L_1 R_3 s^3 + s^2 \left(C_1 L_1 + C_3 L_1 R_3 g_m\right) + s \left(C_3 R_3 + L_1 g_m\right) + 1}$$

10.55 **INVALID-ORDER-55** $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 L_3 g_m s^2}{C_1 C_3 L_1 L_3 s^4 + C_3 L_1 L_3 g_m s^3 + L_1 g_m s + s^2 \left(C_1 L_1 + C_3 L_3\right) + 1}$$

10.56 **INVALID-ORDER-56** $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{L_1 L_3 R_3 g_m s^2}{C_1 C_3 L_1 L_3 R_3 s^4 + R_3 + s^3 \left(C_1 L_1 L_3 + C_3 L_1 L_3 R_3 g_m\right) + s^2 \left(C_1 L_1 R_3 + C_3 L_3 R_3 + L_1 L_3 g_m\right) + s \left(L_1 R_3 g_m + L_3\right)}$$

10.57 **INVALID-ORDER-57** $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_3 g_m s^3 + L_1 L_3 g_m s^2 + L_1 R_3 g_m s}{C_1 C_3 L_1 L_3 s^4 + C_3 L_1 L_3 g_m s^3 + L_1 g_m s + s^2 \left(C_1 L_1 + C_3 L_3\right) + 1}$$

10.58 **INVALID-ORDER-58** $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_3 g_m s^3 + L_1 R_3 g_m s}{C_1 C_3 L_1 L_3 s^4 + s^3 \left(C_1 C_3 L_1 R_3 + C_3 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 + C_3 L_1 R_3 g_m + C_3 L_3\right) + s \left(C_3 R_3 + L_1 g_m\right) + 1}$$

10.59 **INVALID-ORDER-59** $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 g_m s^2 + C_1 R_1 g_m s + g_m}{C_1 C_3 L_1 g_m s^3 + C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3\right)}$$

10.60 **INVALID-ORDER-60** $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_3 g_m s^2 + C_1 R_1 R_3 g_m s + R_3 g_m}{C_1 C_3 L_1 R_3 g_m s^3 + g_m + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3 + C_1 L_1 g_m\right) + s \left(C_1 R_1 g_m + C_1 + C_3 R_3 g_m\right)}$$

10.61 **INVALID-ORDER-61** $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 R_3 g_m s^3 + g_m + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 L_1 g_m\right) + s \left(C_1 R_1 g_m + C_3 R_3 g_m\right)}{C_1 C_3 L_1 g_m s^3 + C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3\right)}$$

10.62 INVALID-ORDER-62 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 g_m s^4 + C_1 C_3 L_3 R_1 g_m s^3 + C_1 R_1 g_m s + g_m + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right)}{C_1 C_3 L_1 g_m s^3 + C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3\right)}$$

10.63 INVALID-ORDER-63 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 L_3 g_m s^3 + C_1 L_3 R_1 g_m s^2 + L_3 g_m s}{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^3 \left(C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3\right) + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

10.64 INVALID-ORDER-64 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^3 \left(C_1 C_3 L_1 R_3 g_m + C_1 C_3 L_3 R_1 g_m\right) + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 L_1 g_m + C_3 L_3 g_m\right) + s \left(C_1 R_1 g_m + C_3 R_3 g_m\right)}{C_1 C_3 L_1 g_m s^3 + C_3 g_m s + s^2 \left(C_1 C_3 R_1 g_m + C_1 C_3\right)}$$

10.65 INVALID-ORDER-65 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 L_1 L_3 R_3 g_m s^3 + C_1 L_3 R_1 R_3 g_m s^2 + L_3 R_3 g_m s}{C_1 C_3 L_1 L_3 R_3 g_m s^4 + R_3 g_m + s^3 \left(C_1 C_3 L_3 R_1 R_3 g_m + C_1 C_3 L_3 R_3 + C_1 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 R_3 g_m + C_1 L_3 R_1 g_m + C_1 L_3 + C_3 L_3 R_3 g_m\right) + s \left(C_1 R_1 R_3 g_m + C_1 R_3 + L_3 g_m\right)}$$

10.66 INVALID-ORDER-66 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_3 g_m s^4 + R_3 g_m + s^3 \left(C_1 C_3 L_3 R_1 R_3 g_m + C_1 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 R_3 g_m + C_1 L_3 R_1 g_m + C_3 L_3 R_3 g_m\right) + s \left(C_1 R_1 R_3 g_m + L_3 g_m\right)}{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^3 \left(C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3\right) + s^2 \left(C_1 L_1 g_m + C_3 L_3 g_m\right) + s \left(C_1 R_1 g_m + C_1\right)}$$

10.67 INVALID-ORDER-67 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_3 g_m s^4 + C_1 C_3 L_3 R_1 R_3 g_m s^3 + C_1 R_1 R_3 g_m s + R_3 g_m + s^2 \left(C_1 L_1 R_3 g_m + C_3 L_3 R_3 g_m\right)}{C_1 C_3 L_1 L_3 g_m s^4 + g_m + s^3 \left(C_1 C_3 L_1 R_3 g_m + C_1 C_3 L_3 R_1 g_m + C_1 C_3 L_3\right) + s^2 \left(C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_3 + C_1 L_1 g_m + C_3 L_3 g_m\right) + s \left(C_1 R_1 g_m + C_1 + C_3 R_3 g_m\right)}$$

10.68 INVALID-ORDER-68 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 R_1 R_3 g_m s}{C_1 C_3 L_1 R_1 R_3 s^3 + R_1 + s^2 \left(C_1 L_1 R_1 + C_3 L_1 R_1 R_3 g_m + C_3 L_1 R_3\right) + s \left(C_3 R_1 R_3 + L_1 R_1 g_m + L_1\right)}$$

10.69 INVALID-ORDER-69 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 L_3 R_1 g_m s^2}{C_1 C_3 L_1 L_3 R_1 s^4 + R_1 + s^3 \left(C_3 L_1 L_3 R_1 g_m + C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 + C_3 L_3 R_1\right) + s \left(L_1 R_1 g_m + L_1\right)}$$

10.70 INVALID-ORDER-70 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{L_1 L_3 R_1 R_3 g_m s^2}{C_1 C_3 L_1 L_3 R_1 R_3 s^4 + R_1 R_3 + s^3 \left(C_1 L_1 L_3 R_1 + C_3 L_1 L_3 R_1 R_3 g_m + C_3 L_1 L_3 R_3\right) + s^2 \left(C_1 L_1 R_1 R_3 + C_3 L_3 R_1 R_3 + L_1 L_3 R_1 g_m + L_1 L_3\right) + s \left(L_1 R_1 R_3 g_m + L_1 R_3 + L_3 R_1\right)}$$

10.71 INVALID-ORDER-71 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \frac{C_3 L_1 L_3 R_1 R_3 g_m s^3 + L_1 L_3 R_1 g_m s^2 + L_1 R_1 R_3 g_m s}{C_1 C_3 L_1 L_3 R_1 s^4 + R_1 + s^3 \left(C_3 L_1 L_3 R_1 g_m + C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 + C_3 L_3 R_1\right) + s \left(L_1 R_1 g_m + L_1\right)}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_3 L_1 L_3 R_1 R_3 g_m s^3 + L_1 R_1 R_3 g_m s}{C_1 C_3 L_1 L_3 R_1 s^4 + R_1 + s^3 \left(C_1 C_3 L_1 R_1 R_3 + C_3 L_1 L_3 R_1 g_m + C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 + C_3 L_1 R_1 R_3 g_m + C_3 L_1 R_3 + C_3 L_3 R_1\right) + s \left(C_3 R_1 R_3 + L_1 R_1 g_m + L_1\right)}$$

10.73 INVALID-ORDER-73 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 g_m s^2 + L_1 g_m s + R_1 g_m}{C_3 L_1 g_m s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.74 INVALID-ORDER-74 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 R_3 g_m s^2 + L_1 R_3 g_m s + R_1 R_3 g_m}{R_1 g_m + s^3 \left(C_1 C_3 L_1 R_1 R_3 g_m + C_1 C_3 L_1 R_3\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_1 R_3 g_m\right) + s \left(C_3 R_1 R_3 g_m + C_3 R_3 + L_1 g_m\right) + 1}$$

10.75 INVALID-ORDER-75 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 R_1 R_3 g_m s^3 + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_3 L_1 R_3 g_m\right) + s \left(C_3 R_1 R_3 g_m + L_1 g_m\right)}{C_3 L_1 g_m s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.76 INVALID-ORDER-76 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 g_m s^4 + C_3 L_1 L_3 g_m s^3 + L_1 g_m s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_3 L_3 R_1 g_m\right)}{C_3 L_1 g_m s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.77 INVALID-ORDER-77 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 L_3 R_1 g_m s^3 + L_1 L_3 g_m s^2 + L_3 R_1 g_m s}{C_3 L_1 L_3 g_m s^3 + L_1 g_m s + R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.78 INVALID-ORDER-78 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 g_m s^4 + R_1 g_m + s^3 \left(C_1 C_3 L_1 R_1 R_3 g_m + C_3 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 R_1 g_m + C_3 L_1 R_3 g_m + C_3 L_3 R_1 g_m\right) + s \left(C_3 R_1 R_3 g_m + L_1 g_m\right)}{C_3 L_1 g_m s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.79 INVALID-ORDER-79 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 L_3 R_1 R_3 g_m s^3 + L_1 L_3 R_3 g_m s^2 + L_3 R_1 R_3 g_m s}{R_1 R_3 g_m + R_3 + s^4 \left(C_1 C_3 L_1 L_3 R_1 R_3 g_m + C_1 C_3 L_1 L_3 R_3\right) + s^3 \left(C_1 L_1 L_3 R_1 g_m + C_1 L_1 L_3 + C_3 L_1 L_3 R_3 g_m\right) + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_1 L_1 R_3 + C_3 L_3 R_1 R_3 g_m + C_3 L_3 R_3 + L_1 L_3 g_m\right) + s \left(L_1 R_3 g_m + L_3 R_1 g_m + L_3\right)}$$

10.80 INVALID-ORDER-80 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 R_3 g_m s^4 + R_1 R_3 g_m + s^3 \left(C_1 L_1 L_3 R_1 g_m + C_3 L_1 L_3 R_3 g_m\right) + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_3 L_3 R_1 R_3 g_m + L_1 L_3 g_m\right) + s \left(L_1 R_3 g_m + L_3 R_1 g_m\right)}{C_3 L_1 L_3 g_m s^3 + L_1 g_m s + R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.81 INVALID-ORDER-81 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 R_3 g_m s^4 + C_3 L_1 L_3 R_3 g_m s^3 + L_1 R_3 g_m s + R_1 R_3 g_m + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_3 L_3 R_1 R_3 g_m\right)}{R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^3 \left(C_1 C_3 L_1 R_1 R_3 g_m + C_1 C_3 L_1 R_3 + C_3 L_1 L_3 g_m\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_1 R_3 g_m + C_3 L_3 R_1 g_m + C_3 L_3\right) + s \left(C_3 R_1 R_3 g_m + C_3 R_3 + L_1 g_m\right) + 1}$$

10.82 INVALID-ORDER-82 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 g_m s^2 + R_1 g_m}{C_1 C_3 R_1 s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.83 INVALID-ORDER-83 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 R_1 R_3 g_m s^2 + R_1 R_3 g_m}{R_1 g_m + s^3 \left(C_1 C_3 L_1 R_1 R_3 g_m + C_1 C_3 L_1 R_3\right) + s^2 \left(C_1 C_3 R_1 R_3 + C_1 L_1 R_1 g_m + C_1 L_1\right) + s \left(C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3\right) + 1}$$

10.84 INVALID-ORDER-84 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 R_1 R_3 g_m s^3 + C_1 L_1 R_1 g_m s^2 + C_3 R_1 R_3 g_m s + R_1 g_m}{C_1 C_3 R_1 s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.85 INVALID-ORDER-85 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 g_m s^4 + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_3 L_3 R_1 g_m\right)}{C_1 C_3 R_1 s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.86 INVALID-ORDER-86 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 L_3 R_1 g_m s^3 + L_3 R_1 g_m s}{C_1 C_3 L_3 R_1 s^3 + C_1 R_1 s + R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.87 INVALID-ORDER-87 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 g_m s^4 + C_1 C_3 L_1 R_1 R_3 g_m s^3 + C_3 R_1 R_3 g_m s + R_1 g_m + s^2 \left(C_1 L_1 R_1 g_m + C_3 L_3 R_1 g_m\right)}{C_1 C_3 R_1 s^2 + s^3 \left(C_1 C_3 L_1 R_1 g_m + C_1 C_3 L_1\right) + s \left(C_3 R_1 g_m + C_3\right)}$$

10.88 INVALID-ORDER-88 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 L_1 L_3 R_1 R_3 g_m s^3 + L_3 R_1 R_3 g_m s}{R_1 R_3 g_m + R_3 + s^4 \left(C_1 C_3 L_1 L_3 R_1 R_3 g_m + C_1 C_3 L_1 L_3 R_3\right) + s^3 \left(C_1 C_3 L_3 R_1 R_3 + C_1 L_1 L_3 R_1 g_m + C_1 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_1 L_1 R_3 + C_1 L_3 R_1 + C_3 L_3 R_1 R_3 g_m + C_3 L_3 R_3\right) + s \left(C_1 R_1 R_3 + L_3 R_1 g_m + L_3\right)}$$

10.89 INVALID-ORDER-89 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 R_3 g_m s^4 + C_1 L_1 L_3 R_1 g_m s^3 + L_3 R_1 g_m s + R_1 R_3 g_m + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_3 L_3 R_1 R_3 g_m\right)}{C_1 C_3 L_3 R_1 s^3 + C_1 R_1 s + R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^2 \left(C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_3 R_1 g_m + C_3 L_3\right) + 1}$$

10.90 INVALID-ORDER-90 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{C_1 C_3 L_1 L_3 R_1 R_3 g_m s^4 + R_1 R_3 g_m + s^2 \left(C_1 L_1 R_1 R_3 g_m + C_3 L_3 R_1 R_3 g_m\right)}{R_1 g_m + s^4 \left(C_1 C_3 L_1 L_3 R_1 g_m + C_1 C_3 L_1 L_3\right) + s^3 \left(C_1 C_3 L_1 R_1 R_3 g_m + C_1 C_3 L_1 R_3 + C_1 C_3 L_3 R_1\right) + s^2 \left(C_1 C_3 R_1 R_3 + C_1 L_1 R_1 g_m + C_1 L_1 + C_3 L_3 R_1 g_m + C_3 L_3\right) + s \left(C_1 R_1 + C_3 R_1 R_3 g_m + C_3 R_3\right) + 1}$$

11 PolynomialError