

Filter Summary Report: CG,TIA,simple,Z1,Z2

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Contents

1    Examined  $H(z)$  for CG TIA simple **Z1 Z2:**  $Z_1 (Z_2 g_m + 1)$

$$H(z) = Z_1 (Z_2 g_m + 1)$$

2    HP

3    BP

3.1    **BP-1**  $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ R_2, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{s (L_1 R_1 R_2 g_m + L_1 R_1)}{C_1 L_1 R_1 s^2 + L_1 s + R_1}$$

Parameters:

Q:  $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$   
wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
bandwidth:  $\frac{1}{C_1 R_1}$   
K-LP: 0  
K-HP: 0  
K-BP:  $R_1 (R_2 g_m + 1)$   
Qz: 0  
Wz: None

4    LP

5    BS

5.1    **BS-1**  $Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ R_2, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \frac{R_1 R_2 g_m + R_1 + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}$$

Parameters:

Q:  $\frac{L_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1}$   
wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
bandwidth:  $\frac{R_1}{L_1}$   
K-LP:  $R_1 (R_2 g_m + 1)$   
K-HP:  $R_1 (R_2 g_m + 1)$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_1 L_1}}$

6    GE

**6.1 GE-1**  $Z(s) = \left( R_1, \frac{R_2(C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_2 R_1 R_2 s + R_1 R_2 g_m + R_1 + s^2 (C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}$$

**Parameters:**

Q:  $\frac{L_2 \sqrt{\frac{1}{C_2 L_2}}}{R_2}$   
 wo:  $\sqrt{\frac{1}{C_2 L_2}}$   
 bandwidth:  $\frac{R_2}{L_2}$   
 K-LP:  $R_1 (R_2 g_m + 1)$   
 K-HP:  $R_1 (R_2 g_m + 1)$   
 K-BP:  $R_1$   
 QZ:  $\frac{L_2 \sqrt{\frac{1}{C_2 L_2}} (R_2 g_m + 1)}{R_2}$   
 WZ:  $\sqrt{\frac{1}{C_2 L_2}}$

## 7 AP

## 8 INVALID-NUMER

**8.1 INVALID-NUMER-1**  $Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_2 R_1 R_2 s + R_1 R_2 g_m + R_1}{C_1 C_2 R_1 R_2 s^2 + s (C_1 R_1 + C_2 R_2) + 1}$$

**Parameters:**

Q:  $\frac{C_1 C_2 R_1 R_2 \sqrt{\frac{1}{C_1 C_2 R_1 R_2}}}{C_1 R_1 + C_2 R_2}$   
 wo:  $\sqrt{\frac{1}{C_1 C_2 R_1 R_2}}$   
 bandwidth:  $\frac{C_1 R_1 + C_2 R_2}{C_1 C_2 R_1 R_2}$   
 K-LP:  $R_1 (R_2 g_m + 1)$   
 K-HP: 0  
 K-BP:  $\frac{C_2 R_1 R_2}{C_1 R_1 + C_2 R_2}$   
 QZ: 0  
 WZ: None

**8.2 INVALID-NUMER-2**  $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_2 L_1 R_1 s + L_1 R_1 g_m}{C_1 C_2 L_1 R_1 s^2 + C_2 L_1 s + C_2 R_1}$$

**Parameters:**

Q:  $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$   
 wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
 bandwidth:  $\frac{1}{C_1 R_1}$   
 K-LP:  $\frac{L_1 g_m}{C_2}$   
 K-HP: 0  
 K-BP:  $R_1$   
 QZ: 0  
 WZ: None

### 8.3 INVALID-NUMER-3 $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

**Parameters:**

Q:  $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$   
 wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
 bandwidth:  $\frac{1}{C_1 R_1}$   
 K-LP:  $\frac{L_1 g_m}{C_2}$   
 K-HP: 0  
 K-BP:  $R_1 (R_2 g_m + 1)$   
 Qz: 0  
 Wz: None

$$H(s) = \frac{L_1 R_1 g_m + s (C_2 L_1 R_1 R_2 g_m + C_2 L_1 R_1)}{C_1 C_2 L_1 R_1 s^2 + C_2 L_1 s + C_2 R_1}$$

## 9 INVALID-WZ

### 9.1 INVALID-WZ-1 $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

**Parameters:**

Q:  $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$   
 wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
 bandwidth:  $\frac{1}{C_1 R_1}$   
 K-LP:  $\frac{L_1 g_m}{C_2}$   
 K-HP:  $\frac{L_2 g_m}{C_1}$   
 K-BP:  $R_1$   
 Qz:  $L_2 g_m \sqrt{\frac{1}{C_1 L_1}}$   
 Wz:  $\sqrt{\frac{1}{C_2 L_2}}$

$$H(s) = \frac{C_2 L_1 L_2 R_1 g_m s^2 + C_2 L_1 R_1 s + L_1 R_1 g_m}{C_1 C_2 L_1 R_1 s^2 + C_2 L_1 s + C_2 R_1}$$

### 9.2 INVALID-WZ-2 $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

**Parameters:**

Q:  $C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}$   
 wo:  $\sqrt{\frac{1}{C_1 L_1}}$   
 bandwidth:  $\frac{1}{C_1 R_1}$   
 K-LP:  $\frac{L_1 g_m}{C_2}$   
 K-HP:  $\frac{L_2 g_m}{C_1}$   
 K-BP:  $R_1 (R_2 g_m + 1)$   
 Qz:  $\frac{L_2 g_m \sqrt{\frac{1}{C_1 L_1}}}{R_2 g_m + 1}$   
 Wz:  $\sqrt{\frac{1}{C_2 L_2}}$

$$H(s) = \frac{C_2 L_1 L_2 R_1 g_m s^2 + L_1 R_1 g_m + s (C_2 L_1 R_1 R_2 g_m + C_2 L_1 R_1)}{C_1 C_2 L_1 R_1 s^2 + C_2 L_1 s + C_2 R_1}$$

## 10 INVALID-ORDER

$$10.1 \quad \text{INVALID-ORDER-1} \quad Z(s) = (R_1, R_2, \infty, \infty, \infty, \infty)$$

$$H(s) = R_1 R_2 g_m + R_1$$

$$10.2 \quad \text{INVALID-ORDER-2} \quad Z(s) = \left( R_1, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 R_1 s + R_1 g_m}{C_2 s}$$

$$10.3 \quad \text{INVALID-ORDER-3} \quad Z(s) = \left( R_1, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 R_1 R_2 s + R_1 R_2 g_m + R_1}{C_2 R_2 s + 1}$$

$$10.4 \quad \text{INVALID-ORDER-4} \quad Z(s) = \left( R_1, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{R_1 g_m + s (C_2 R_1 R_2 g_m + C_2 R_1)}{C_2 s}$$

$$10.5 \quad \text{INVALID-ORDER-5} \quad Z(s) = \left( R_1, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_2 R_1 g_m s^2 + C_2 R_1 s + R_1 g_m}{C_2 s}$$

$$10.6 \quad \text{INVALID-ORDER-6} \quad Z(s) = \left( R_1, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_2 R_1 g_m s^2 + R_1 g_m + s (C_2 R_1 R_2 g_m + C_2 R_1)}{C_2 s}$$

$$10.7 \quad \text{INVALID-ORDER-7} \quad Z(s) = \left( R_1, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{L_2 R_1 g_m s + R_1 R_2 g_m + R_1 + s^2 (C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1)}{C_2 L_2 s^2 + 1}$$

$$10.8 \quad \text{INVALID-ORDER-8} \quad Z(s) = (L_1 s, R_2, \infty, \infty, \infty, \infty)$$

$$H(s) = s (L_1 R_2 g_m + L_1)$$

$$10.9 \quad \text{INVALID-ORDER-9} \quad Z(s) = \left( L_1 s, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 s + L_1 g_m}{C_2}$$

$$10.10 \quad \text{INVALID-ORDER-10} \quad Z(s) = \left( L_1 s, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 R_2 s^2 + s (L_1 R_2 g_m + L_1)}{C_2 R_2 s + 1}$$

$$10.11 \quad \text{INVALID-ORDER-11} \quad Z(s) = \left( L_1 s, \quad R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 g_m + s (C_2 L_1 R_2 g_m + C_2 L_1)}{C_2}$$

$$10.12 \quad \text{INVALID-ORDER-12} \quad Z(s) = \left( L_1 s, \quad L_2 s + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_1 L_2 g_m s^2 + C_2 L_1 s + L_1 g_m}{C_2}$$

$$10.13 \quad \text{INVALID-ORDER-13} \quad Z(s) = \left( L_1 s, \quad L_2 s + R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_1 L_2 g_m s^2 + L_1 g_m + s (C_2 L_1 R_2 g_m + C_2 L_1)}{C_2}$$

$$10.14 \quad \text{INVALID-ORDER-14} \quad Z(s) = \left( L_1 s, \quad \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_1 L_2 g_m s^2 + s^3 (C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s (L_1 R_2 g_m + L_1)}{C_2 L_2 s^2 + 1}$$

$$10.15 \quad \text{INVALID-ORDER-15} \quad Z(s) = \left( L_1 s, \quad \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_1 R_2 s^2 + s^3 (C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s (L_1 R_2 g_m + L_1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}$$

$$10.16 \quad \text{INVALID-ORDER-16} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_2 g_m + 1}{C_1 s}$$

$$10.17 \quad \text{INVALID-ORDER-17} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 s + g_m}{C_1 C_2 s^2}$$

$$10.18 \quad \text{INVALID-ORDER-18} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad \frac{R_2}{C_2 R_2 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 R_2 s + R_2 g_m + 1}{C_1 C_2 R_2 s^2 + C_1 s}$$

$$10.19 \quad \text{INVALID-ORDER-19} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{g_m + s (C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad L_2 s + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_2 g_m s^2 + C_2 s + g_m}{C_1 C_2 s^2}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad L_2 s + R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_2 g_m s^2 + g_m + s (C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_2 g_m s + R_2 g_m + s^2 (C_2 L_2 R_2 g_m + C_2 L_2) + 1}{C_1 C_2 L_2 s^3 + C_1 s}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left( \frac{1}{C_1 s}, \quad \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 R_2 s + R_2 g_m + s^2 (C_2 L_2 R_2 g_m + C_2 L_2) + 1}{C_1 C_2 L_2 s^3 + C_1 C_2 R_2 s^2 + C_1 s}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 R_2 g_m + R_1}{C_1 R_1 s + 1}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 R_1 s + R_1 g_m}{C_1 C_2 R_1 s^2 + C_2 s}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_1 g_m + s (C_2 R_1 R_2 g_m + C_2 R_1)}{C_1 C_2 R_1 s^2 + C_2 s}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad L_2 s + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_2 R_1 g_m s^2 + C_2 R_1 s + R_1 g_m}{C_1 C_2 R_1 s^2 + C_2 s}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad L_2 s + R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_2 R_1 g_m s^2 + R_1 g_m + s (C_2 R_1 R_2 g_m + C_2 R_1)}{C_1 C_2 R_1 s^2 + C_2 s}$$

$$10.29 \quad \text{INVALID-ORDER-29} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_2 R_1 g_m s + R_1 R_2 g_m + R_1 + s^2 (C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1)}{C_1 C_2 L_2 R_1 s^3 + C_1 R_1 s + C_2 L_2 s^2 + 1}$$

$$10.30 \quad \text{INVALID-ORDER-30} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \frac{R_2(C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 R_1 R_2 s + R_1 R_2 g_m + R_1 + s^2 (C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1)}{C_1 C_2 L_2 R_1 s^3 + s^2 (C_1 C_2 R_1 R_2 + C_2 L_2) + s (C_1 R_1 + C_2 R_2) + 1}$$

$$10.31 \quad \text{INVALID-ORDER-31} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, R_2, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s (C_1 R_1 R_2 g_m + C_1 R_1) + 1}{C_1 s}$$

$$10.32 \quad \text{INVALID-ORDER-32} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 R_1 s^2 + g_m + s (C_1 R_1 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.33 \quad \text{INVALID-ORDER-33} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 R_1 R_2 s^2 + R_2 g_m + s (C_1 R_1 R_2 g_m + C_1 R_1 + C_2 R_2) + 1}{C_1 C_2 R_2 s^2 + C_1 s}$$

$$10.34 \quad \text{INVALID-ORDER-34} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{g_m + s^2 (C_1 C_2 R_1 R_2 g_m + C_1 C_2 R_1) + s (C_1 R_1 g_m + C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.35 \quad \text{INVALID-ORDER-35} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_2 R_1 g_m s^3 + g_m + s^2 (C_1 C_2 R_1 + C_2 L_2 g_m) + s (C_1 R_1 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.36 \quad \text{INVALID-ORDER-36} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_2 R_1 g_m s^3 + g_m + s^2 (C_1 C_2 R_1 R_2 g_m + C_1 C_2 R_1 + C_2 L_2 g_m) + s (C_1 R_1 g_m + C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.37 \quad \text{INVALID-ORDER-37} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^3 (C_1 C_2 L_2 R_1 R_2 g_m + C_1 C_2 L_2 R_1) + s^2 (C_1 L_2 R_1 g_m + C_2 L_2 R_2 g_m + C_2 L_2) + s (C_1 R_1 R_2 g_m + C_1 R_1 + L_2 g_m) + 1}{C_1 C_2 L_2 s^3 + C_1 s}$$

$$10.38 \quad \text{INVALID-ORDER-38} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, \frac{R_2(C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^3 (C_1 C_2 L_2 R_1 R_2 g_m + C_1 C_2 L_2 R_1) + s^2 (C_1 C_2 R_1 R_2 + C_2 L_2 R_2 g_m + C_2 L_2) + s (C_1 R_1 R_2 g_m + C_1 R_1 + C_2 R_2) + 1}{C_1 C_2 L_2 s^3 + C_1 C_2 R_2 s^2 + C_1 s}$$



$$10.39 \quad \text{INVALID-ORDER-39} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^2 (C_1 L_1 R_2 g_m + C_1 L_1) + 1}{C_1 s}$$

$$10.40 \quad \text{INVALID-ORDER-40} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 s^3 + C_1 L_1 g_m s^2 + C_2 s + g_m}{C_1 C_2 s^2}$$

$$10.41 \quad \text{INVALID-ORDER-41} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad \frac{R_2}{C_2 R_2 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 R_2 s^3 + C_2 R_2 s + R_2 g_m + s^2 (C_1 L_1 R_2 g_m + C_1 L_1) + 1}{C_1 C_2 R_2 s^2 + C_1 s}$$

$$10.42 \quad \text{INVALID-ORDER-42} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 L_1 g_m s^2 + g_m + s^3 (C_1 C_2 L_1 R_2 g_m + C_1 C_2 L_1) + s (C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.43 \quad \text{INVALID-ORDER-43} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad L_2 s + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 L_2 g_m s^4 + C_1 C_2 L_1 s^3 + C_2 s + g_m + s^2 (C_1 L_1 g_m + C_2 L_2 g_m)}{C_1 C_2 s^2}$$

$$10.44 \quad \text{INVALID-ORDER-44} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad L_2 s + R_2 + \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 L_2 g_m s^4 + g_m + s^3 (C_1 C_2 L_1 R_2 g_m + C_1 C_2 L_1) + s^2 (C_1 L_1 g_m + C_2 L_2 g_m) + s (C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.45 \quad \text{INVALID-ORDER-45} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 L_1 L_2 g_m s^3 + L_2 g_m s + R_2 g_m + s^4 (C_1 C_2 L_1 L_2 R_2 g_m + C_1 C_2 L_1 L_2) + s^2 (C_1 L_1 R_2 g_m + C_1 L_1 + C_2 L_2 R_2 g_m + C_2 L_2) + 1}{C_1 C_2 L_2 s^3 + C_1 s}$$

$$10.46 \quad \text{INVALID-ORDER-46} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 R_2 s^3 + C_2 R_2 s + R_2 g_m + s^4 (C_1 C_2 L_1 L_2 R_2 g_m + C_1 C_2 L_1 L_2) + s^2 (C_1 L_1 R_2 g_m + C_1 L_1 + C_2 L_2 R_2 g_m + C_2 L_2) + 1}{C_1 C_2 L_2 s^3 + C_1 C_2 R_2 s^2 + C_1 s}$$

$$10.47 \quad \text{INVALID-ORDER-47} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad R_2, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{s (L_1 R_2 g_m + L_1)}{C_1 L_1 s^2 + 1}$$

$$10.48 \quad \text{INVALID-ORDER-48} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \frac{1}{C_2 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2 L_1 s + L_1 g_m}{C_1 C_2 L_1 s^2 + C_2}$$

$$10.49 \quad \text{INVALID-ORDER-49} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 R_2 s^2 + s (L_1 R_2 g_m + L_1)}{C_1 C_2 L_1 R_2 s^3 + C_1 L_1 s^2 + C_2 R_2 s + 1}$$

$$10.50 \quad \text{INVALID-ORDER-50} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{L_1 g_m + s (C_2 L_1 R_2 g_m + C_2 L_1)}{C_1 C_2 L_1 s^2 + C_2}$$

$$10.51 \quad \text{INVALID-ORDER-51} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 L_2 g_m s^2 + C_2 L_1 s + L_1 g_m}{C_1 C_2 L_1 s^2 + C_2}$$

$$10.52 \quad \text{INVALID-ORDER-52} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 L_2 g_m s^2 + L_1 g_m + s (C_2 L_1 R_2 g_m + C_2 L_1)}{C_1 C_2 L_1 s^2 + C_2}$$

$$10.53 \quad \text{INVALID-ORDER-53} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{L_1 L_2 g_m s^2 + s^3 (C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s (L_1 R_2 g_m + L_1)}{C_1 C_2 L_1 L_2 s^4 + s^2 (C_1 L_1 + C_2 L_2) + 1}$$

$$10.54 \quad \text{INVALID-ORDER-54} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_2 L_1 R_2 s^2 + s^3 (C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s (L_1 R_2 g_m + L_1)}{C_1 C_2 L_1 L_2 s^4 + C_1 C_2 L_1 R_2 s^3 + C_2 R_2 s + s^2 (C_1 L_1 + C_2 L_2) + 1}$$

$$10.55 \quad \text{INVALID-ORDER-55} \quad Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, R_2, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^2 (C_1 L_1 R_2 g_m + C_1 L_1) + s (C_1 R_1 R_2 g_m + C_1 R_1) + 1}{C_1 s}$$

$$10.56 \quad \text{INVALID-ORDER-56} \quad Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 s^3 + g_m + s^2 (C_1 C_2 R_1 + C_1 L_1 g_m) + s (C_1 R_1 g_m + C_2)}{C_1 C_2 s^2}$$

$$10.57 \quad \text{INVALID-ORDER-57} \quad Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$$

$$H(s) = \frac{C_1 C_2 L_1 R_2 s^3 + R_2 g_m + s^2 (C_1 C_2 R_1 R_2 + C_1 L_1 R_2 g_m + C_1 L_1) + s (C_1 R_1 R_2 g_m + C_1 R_1 + C_2 R_2) + 1}{C_1 C_2 R_2 s^2 + C_1 s}$$

**10.58 INVALID-ORDER-58**  $Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{g_m + s^3 (C_1 C_2 L_1 R_2 g_m + C_1 C_2 L_1) + s^2 (C_1 C_2 R_1 R_2 g_m + C_1 C_2 R_1 + C_1 L_1 g_m) + s (C_1 R_1 g_m + C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

**10.59 INVALID-ORDER-59**  $Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 L_2 g_m s^4 + g_m + s^3 (C_1 C_2 L_1 + C_1 C_2 L_2 R_1 g_m) + s^2 (C_1 C_2 R_1 + C_1 L_1 g_m + C_2 L_2 g_m) + s (C_1 R_1 g_m + C_2)}{C_1 C_2 s^2}$$

**10.60 INVALID-ORDER-60**  $Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 L_2 g_m s^4 + g_m + s^3 (C_1 C_2 L_1 R_2 g_m + C_1 C_2 L_1 + C_1 C_2 L_2 R_1 g_m) + s^2 (C_1 C_2 R_1 R_2 g_m + C_1 C_2 R_1 + C_1 L_1 g_m + C_2 L_2 g_m) + s (C_1 R_1 g_m + C_2 R_2 g_m + C_2)}{C_1 C_2 s^2}$$

**10.61 INVALID-ORDER-61**  $Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_2 g_m + s^4 (C_1 C_2 L_1 L_2 R_2 g_m + C_1 C_2 L_1 L_2) + s^3 (C_1 C_2 L_2 R_1 R_2 g_m + C_1 C_2 L_2 R_1 + C_1 L_1 L_2 g_m) + s^2 (C_1 L_1 R_2 g_m + C_1 L_1 + C_1 L_2 R_1 g_m + C_2 L_2 R_2 g_m + C_2 L_2) + s (C_1 R_1 R_2 g_m + C_1 R_1 + L_2 g_m) + 1}{C_1 C_2 L_2 s^3 + C_1 s}$$

**10.62 INVALID-ORDER-62**  $Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_2 g_m + s^4 (C_1 C_2 L_1 L_2 R_2 g_m + C_1 C_2 L_1 L_2) + s^3 (C_1 C_2 L_1 R_2 + C_1 C_2 L_2 R_1 R_2 g_m + C_1 C_2 L_2 R_1) + s^2 (C_1 C_2 R_1 R_2 + C_1 L_1 R_2 g_m + C_1 L_1 + C_2 L_2 R_2 g_m + C_2 L_2) + s (C_1 R_1 R_2 g_m + C_1 R_1 + C_2 R_2) + 1}{C_1 C_2 L_2 s^3 + C_1 C_2 R_2 s^2 + C_1 s}$$

**10.63 INVALID-ORDER-63**  $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_2 L_1 R_1 R_2 s^2 + s (L_1 R_1 R_2 g_m + L_1 R_1)}{C_1 C_2 L_1 R_1 R_2 s^3 + R_1 + s^2 (C_1 L_1 R_1 + C_2 L_1 R_2) + s (C_2 R_1 R_2 + L_1)}$$

**10.64 INVALID-ORDER-64**  $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{L_1 L_2 R_1 g_m s^2 + s^3 (C_2 L_1 L_2 R_1 R_2 g_m + C_2 L_1 L_2 R_1) + s (L_1 R_1 R_2 g_m + L_1 R_1)}{C_1 C_2 L_1 L_2 R_1 s^4 + C_2 L_1 L_2 s^3 + L_1 s + R_1 + s^2 (C_1 L_1 R_1 + C_2 L_2 R_1)}$$

**10.65 INVALID-ORDER-65**  $Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_2 L_1 R_1 R_2 s^2 + s^3 (C_2 L_1 L_2 R_1 R_2 g_m + C_2 L_1 L_2 R_1) + s (L_1 R_1 R_2 g_m + L_1 R_1)}{C_1 C_2 L_1 L_2 R_1 s^4 + R_1 + s^3 (C_1 C_2 L_1 R_1 R_2 + C_2 L_1 L_2) + s^2 (C_1 L_1 R_1 + C_2 L_1 R_2 + C_2 L_2 R_1) + s (C_2 R_1 R_2 + L_1)}$$

**10.66 INVALID-ORDER-66**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, R_2, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_1 R_2 g_m + R_1 + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1) + s (L_1 R_2 g_m + L_1)}{C_1 L_1 s^2 + 1}$$

**10.67 INVALID-ORDER-67**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 R_1 s^3 + R_1 g_m + s^2 (C_1 L_1 R_1 g_m + C_2 L_1) + s (C_2 R_1 + L_1 g_m)}{C_1 C_2 L_1 s^3 + C_2 s}$$

**10.68 INVALID-ORDER-68**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 R_1 R_2 s^3 + R_1 R_2 g_m + R_1 + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1 + C_2 L_1 R_2) + s (C_2 R_1 R_2 + L_1 R_2 g_m + L_1)}{C_1 C_2 L_1 R_2 s^3 + C_1 L_1 s^2 + C_2 R_2 s + 1}$$

**10.69 INVALID-ORDER-69**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_1 g_m + s^3 (C_1 C_2 L_1 R_1 R_2 g_m + C_1 C_2 L_1 R_1) + s^2 (C_1 L_1 R_1 g_m + C_2 L_1 R_2 g_m + C_2 L_1) + s (C_2 R_1 R_2 g_m + C_2 R_1 + L_1 g_m)}{C_1 C_2 L_1 s^3 + C_2 s}$$

**10.70 INVALID-ORDER-70**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 L_2 R_1 g_m s^4 + R_1 g_m + s^3 (C_1 C_2 L_1 R_1 + C_2 L_1 L_2 g_m) + s^2 (C_1 L_1 R_1 g_m + C_2 L_1 + C_2 L_2 R_1 g_m) + s (C_2 R_1 + L_1 g_m)}{C_1 C_2 L_1 s^3 + C_2 s}$$

**10.71 INVALID-ORDER-71**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 L_2 R_1 g_m s^4 + R_1 g_m + s^3 (C_1 C_2 L_1 R_1 R_2 g_m + C_1 C_2 L_1 R_1 + C_2 L_1 L_2 g_m) + s^2 (C_1 L_1 R_1 g_m + C_2 L_1 R_2 g_m + C_2 L_1 + C_2 L_2 R_1 g_m) + s (C_2 R_1 R_2 g_m + C_2 R_1 + L_1 g_m)}{C_1 C_2 L_1 s^3 + C_2 s}$$

**10.72 INVALID-ORDER-72**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \frac{L_2 s}{C_2 L_2 s^2 + 1} + R_2, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_1 R_2 g_m + R_1 + s^4 (C_1 C_2 L_1 L_2 R_1 R_2 g_m + C_1 C_2 L_1 L_2 R_1) + s^3 (C_1 L_1 L_2 R_1 g_m + C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1 + C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1 + L_1 L_2 g_m) + s (L_1 R_2 g_m + L_1 + L_2 R_1 g_m)}{C_1 C_2 L_1 L_2 s^4 + s^2 (C_1 L_1 + C_2 L_2) + 1}$$

**10.73 INVALID-ORDER-73**  $Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{R_1 R_2 g_m + R_1 + s^4 (C_1 C_2 L_1 L_2 R_1 R_2 g_m + C_1 C_2 L_1 L_2 R_1) + s^3 (C_1 C_2 L_1 R_1 R_2 + C_2 L_1 L_2 R_2 g_m + C_2 L_1 L_2) + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1 + C_2 L_1 R_2 + C_2 L_2 R_1 R_2 g_m + C_2 L_2 R_1) + s (C_2 R_1 R_2 + L_1 R_2 g_m + L_1)}{C_1 C_2 L_1 L_2 s^4 + C_1 C_2 L_1 R_2 s^3 + C_2 R_2 s + s^2 (C_1 L_1 + C_2 L_2) + 1}$$

**10.74 INVALID-ORDER-74**  $Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \frac{1}{C_2 s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 R_1 s^3 + C_1 L_1 R_1 g_m s^2 + C_2 R_1 s + R_1 g_m}{C_1 C_2 L_1 s^3 + C_1 C_2 R_1 s^2 + C_2 s}$$

**10.75 INVALID-ORDER-75**  $Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1 C_2 L_1 R_1 R_2 s^3 + C_2 R_1 R_2 s + R_1 R_2 g_m + R_1 + s^2 (C_1 L_1 R_1 R_2 g_m + C_1 L_1 R_1)}{C_1 C_2 L_1 R_2 s^3 + s^2 (C_1 C_2 R_1 R_2 + C_1 L_1) + s (C_1 R_1 + C_2 R_2) + 1}$$

**10.76 INVALID-ORDER-76**  $Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1L_1R_1g_ms^2 + R_1g_m + s^3(C_1C_2L_1R_1R_2g_m + C_1C_2L_1R_1) + s(C_2R_1R_2g_m + C_2R_1)}{C_1C_2L_1s^3 + C_1C_2R_1s^2 + C_2s}$$

**10.77 INVALID-ORDER-77**  $Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, L_2s + \frac{1}{C_2s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1C_2L_1L_2R_1g_ms^4 + C_1C_2L_1R_1s^3 + C_2R_1s + R_1g_m + s^2(C_1L_1R_1g_m + C_2L_2R_1g_m)}{C_1C_2L_1s^3 + C_1C_2R_1s^2 + C_2s}$$

**10.78 INVALID-ORDER-78**  $Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1C_2L_1L_2R_1g_ms^4 + R_1g_m + s^3(C_1C_2L_1R_1R_2g_m + C_1C_2L_1R_1) + s^2(C_1L_1R_1g_m + C_2L_2R_1g_m) + s(C_2R_1R_2g_m + C_2R_1)}{C_1C_2L_1s^3 + C_1C_2R_1s^2 + C_2s}$$

**10.79 INVALID-ORDER-79**  $Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \frac{L_2s}{C_2L_2s^2+1} + R_2, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1L_1L_2R_1g_ms^3 + L_2R_1g_ms + R_1R_2g_m + R_1 + s^4(C_1C_2L_1L_2R_1R_2g_m + C_1C_2L_1L_2R_1) + s^2(C_1L_1R_1R_2g_m + C_1L_1R_1 + C_2L_2R_1R_2g_m + C_2L_2R_1)}{C_1C_2L_1L_2s^4 + C_1C_2L_2R_1s^3 + C_1R_1s + s^2(C_1L_1 + C_2L_2) + 1}$$

**10.80 INVALID-ORDER-80**  $Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \infty \right)$

$$H(s) = \frac{C_1C_2L_1R_1R_2s^3 + C_2R_1R_2s + R_1R_2g_m + R_1 + s^4(C_1C_2L_1L_2R_1R_2g_m + C_1C_2L_1L_2R_1) + s^2(C_1L_1R_1R_2g_m + C_1L_1R_1 + C_2L_2R_1R_2g_m + C_2L_2R_1)}{C_1C_2L_1L_2s^4 + s^3(C_1C_2L_1R_2 + C_1C_2L_2R_1) + s^2(C_1C_2R_1R_2 + C_1L_1 + C_2L_2) + s(C_1R_1 + C_2R_2) + 1}$$

## 11 PolynomialError