

# Filter Summary Report: TIA,simple,Z1,ZL

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10.82INVALID-ORDER-82	$Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \infty, \infty, \frac{1}{C_L s} \right)$	20
10.83INVALID-ORDER-83	$Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$	20
10.84INVALID-ORDER-84	$Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$	20
10.85INVALID-ORDER-85	$Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$	20
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10.88INVALID-ORDER-88	$Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$	21
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<b>11 PolynomialError</b>	<b>21</b>
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# 1 Examined $H(z)$ for TIA 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 $Z(s) = \left( R_1, \infty, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

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

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

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

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

**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

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

## 4 LP

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

**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

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

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

**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

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

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

**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

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

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

**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

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

## 5 BS

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

**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:  $\sqrt{\frac{1}{C_L L_L}}$

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

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

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

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

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

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

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

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



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

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

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

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

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

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

**Parameters:**

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

## 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:**

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

**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:**

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

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

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

**Parameters:**

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

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

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

**Parameters:**

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

## 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**  $Z(s) = \left( R_1, \infty, \infty, \infty, \infty, \frac{1}{C_L s} \right)$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$10.9 \quad \text{INVALID-ORDER-9} \quad Z(s) = (L_1 s, \infty, \infty, \infty, \infty, R_L)$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

10.90    INVALID-ORDER-90

$$Z(s) = \left( \frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \infty, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$$

$$H(s) = \frac{C_1C_LL_1L_LR_1R_Lg_ms^4 + R_1R_Lg_m + s^2(C_1L_1R_1R_Lg_m + C_LL_LR_1R_Lg_m)}{R_1g_m + s^4(C_1C_LL_1L_LR_1g_m + C_1C_LL_1L_L) + s^3(C_1C_LL_1R_1R_Lg_m + C_1C_LL_1R_L + C_1C_LL_LR_1) + s^2(C_1C_LR_1R_L + C_1L_1R_1g_m + C_1L_1 + C_LL_LR_1g_m + C_LL_L) + s(C_1R_1 + C_LR_1R_Lg_m + C_LR_L) + 1}$$

11    PolynomialError