

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

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10.25INVALID-ORDER-25	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L \right)$	11
10.26INVALID-ORDER-26	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$	11
10.27INVALID-ORDER-27	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$	11
10.28INVALID-ORDER-28	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$	11
10.29INVALID-ORDER-29	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$	12
10.30INVALID-ORDER-30	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$	12
10.31INVALID-ORDER-31	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$	12
10.32INVALID-ORDER-32	$Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$	12
10.33INVALID-ORDER-33	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L \right)$	12
10.34INVALID-ORDER-34	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$	12
10.35INVALID-ORDER-35	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$	12
10.36INVALID-ORDER-36	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$	12
10.37INVALID-ORDER-37	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$	12
10.38INVALID-ORDER-38	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$	12
10.39INVALID-ORDER-39	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$	13
10.40INVALID-ORDER-40	$Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$	13
10.41INVALID-ORDER-41	$Z(s) = \left(\infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L \right)$	13
10.42INVALID-ORDER-42	$Z(s) = \left(\infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$	13
10.43INVALID-ORDER-43	$Z(s) = \left(\infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$	13

10.44INVALID-ORDER-44	$Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$	13
10.45INVALID-ORDER-45	$Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, L_Ls + \frac{1}{C_Ls} \right)$	13
10.46INVALID-ORDER-46	$Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, \frac{L_Ls}{C_LL_Ls^2+1} \right)$	13
10.47INVALID-ORDER-47	$Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$	13
10.48INVALID-ORDER-48	$Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, \frac{C_LL_LR_Ls^2+L_Ls+R_L}{C_LL_Ls^2+1} \right)$	13
10.49INVALID-ORDER-49	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, R_L \right)$	14
10.50INVALID-ORDER-50	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, \frac{1}{C_Ls} \right)$	14
10.51INVALID-ORDER-51	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, \frac{R_L}{C_LR_Ls+1} \right)$	14
10.52INVALID-ORDER-52	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$	14
10.53INVALID-ORDER-53	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, L_Ls + \frac{1}{C_Ls} \right)$	14
10.54INVALID-ORDER-54	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, \frac{L_Ls}{C_LL_Ls^2+1} \right)$	14
10.55INVALID-ORDER-55	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$	14
10.56INVALID-ORDER-56	$Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, \frac{C_LL_LR_Ls^2+L_Ls+R_L}{C_LL_Ls^2+1} \right)$	14
10.57INVALID-ORDER-57	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, R_L \right)$	14
10.58INVALID-ORDER-58	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{1}{C_Ls} \right)$	14
10.59INVALID-ORDER-59	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{R_L}{C_LR_Ls+1} \right)$	15
10.60INVALID-ORDER-60	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$	15
10.61INVALID-ORDER-61	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, L_Ls + \frac{1}{C_Ls} \right)$	15
10.62INVALID-ORDER-62	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{L_Ls}{C_LL_Ls^2+1} \right)$	15
10.63INVALID-ORDER-63	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$	15
10.64INVALID-ORDER-64	$Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{C_LL_LR_Ls^2+L_Ls+R_L}{C_LL_Ls^2+1} \right)$	15

11 PolynomialError

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1 Examined $H(z)$ for CG TIA simple Z2 ZL: $\frac{Z_2 Z_L g_m + Z_L}{Z_2 g_m + 1}$

$$H(z) = \frac{Z_2 Z_L g_m + Z_L}{Z_2 g_m + 1}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

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

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: R_L
 Qz: None
 Wz: None

3.2 BP-2 $Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

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

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: R_L
 Qz: None
 Wz: None

3.3 BP-3 $Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

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

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: R_L
 Qz: None
 Wz: None

3.4 BP-4 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

Parameters:

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

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

3.5 BP-5 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

Parameters:

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

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

3.6 BP-6 $Z(s) = \left(\infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

Parameters:

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

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

3.7 BP-7 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$

Parameters:

Q: $C_L R_L \sqrt{\frac{1}{C_L L_L}}$
 wo: $\sqrt{\frac{1}{C_L L_L}}$
 bandwidth: $\frac{1}{C_L R_L}$

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

K-LP: 0
 K-HP: 0
 K-BP: R_L
 Qz: None
 Wz: None

$$\mathbf{3.8 \quad BP-8} \quad Z(s) = \left(\infty, \frac{R_2(C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \frac{L_L R_L s}{C_L L_L R_L s^2 + L_L s + R_L} \right)$$

Parameters:

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

4 LP

5 BS

$$\mathbf{5.1 \quad BS-1} \quad Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{R_L(C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

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: R_L
 K-HP: R_L
 K-BP: 0
 Qz: None
 Wz: $\sqrt{\frac{1}{C_L L_L}}$

$$\mathbf{5.2 \quad BS-2} \quad Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L(C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$$

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: R_L

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

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

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

K-HP: R_L
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.3 BS-3 $Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$

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: R_L
K-HP: R_L
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

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

5.4 BS-4 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$

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: R_L
K-HP: R_L
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

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

5.5 BS-5 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L (C_L L_L s^2 + 1)}{C_L L_L s^2 + C_L R_L s + 1} \right)$

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: R_L
K-HP: R_L
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

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

5.6 BS-6 $Z(s) = \left(\infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$

Parameters:

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

$$H(s) = \frac{C_LL_LR_Ls^2 + R_L}{C_LL_Ls^2 + C_LR_Ls + 1}$$

5.7 BS-7 $Z(s) = \left(\infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$

Parameters:

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

$$H(s) = \frac{C_LL_LR_Ls^2 + R_L}{C_LL_Ls^2 + C_LR_Ls + 1}$$

5.8 BS-8 $Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{R_L(C_LL_Ls^2+1)}{C_LL_Ls^2+C_LR_Ls+1} \right)$

Parameters:

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

$$H(s) = \frac{C_LL_LR_Ls^2 + R_L}{C_LL_Ls^2 + C_LR_Ls + 1}$$

6 GE

7 AP

8 INVALID-NUMER

9 INVALID-WZ

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (\infty, R_2, \infty, \infty, \infty, R_L)$

$$H(s) = R_L$$

10.2 INVALID-ORDER-2 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{1}{C_L s}\right)$

$$H(s) = \frac{1}{C_L s}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1}\right)$

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

10.4 INVALID-ORDER-4 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, R_L + \frac{1}{C_L s}\right)$

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

10.5 INVALID-ORDER-5 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, L_L s + \frac{1}{C_L s}\right)$

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

10.6 INVALID-ORDER-6 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1}\right)$

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

10.7 INVALID-ORDER-7 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_2 g_m + s^2 (C_L L_L R_2 g_m + C_L L_L) + s (C_L R_2 R_L g_m + C_L R_L) + 1}{s (C_L R_2 g_m + C_L)}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(\infty, R_2, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1}\right)$

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

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

$$H(s) = R_L$$

$$\textbf{10.10 INVALID-ORDER-10 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$$

$$H(s) = \frac{1}{C_L s}$$

$$\textbf{10.11 INVALID-ORDER-11 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

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

$$\textbf{10.12 INVALID-ORDER-12 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

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

$$\textbf{10.13 INVALID-ORDER-13 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$$

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

$$\textbf{10.14 INVALID-ORDER-14 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$$

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

$$\textbf{10.15 INVALID-ORDER-15 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_2 C_L L_L s^3 + g_m + s^2(C_2 C_L R_L + C_L L_L g_m) + s(C_2 + C_L R_L g_m)}{C_2 C_L s^2 + C_L g_m s}$$

$$\textbf{10.16 INVALID-ORDER-16 } Z(s) = \left(\infty, \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$$

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

$$\textbf{10.17 INVALID-ORDER-17 } Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, R_L \right)$$

$$H(s) = R_L$$

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

$$H(s) = \frac{1}{C_L s}$$

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

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

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$$

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

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

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

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

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

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$$

$$H(s) = \frac{C_2 C_L L_L R_2 s^3 + R_2 g_m + s^2 (C_2 C_L R_2 R_L + C_L L_L R_2 g_m + C_L L_L) + s (C_2 R_2 + C_L R_2 R_L g_m + C_L R_L) + 1}{C_2 C_L R_2 s^2 + s (C_L R_2 g_m + C_L)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left(\infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$$

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

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L \right)$$

$$H(s) = R_L$$

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

$$H(s) = \frac{1}{C_L s}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$$

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

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

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

10.29 INVALID-ORDER-29 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$

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

10.30 INVALID-ORDER-30 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

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

10.31 INVALID-ORDER-31 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

$$H(s) = \frac{g_m + s^3 (C_2 C_L L_L R_2 g_m + C_2 C_L L_L) + s^2 (C_2 C_L R_2 R_L g_m + C_2 C_L R_L + C_L L_L g_m) + s (C_2 R_2 g_m + C_2 + C_L R_L g_m)}{C_L g_m s + s^2 (C_2 C_L R_2 g_m + C_2 C_L)}$$

10.32 INVALID-ORDER-32 $Z(s) = \left(\infty, R_2 + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$

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

10.33 INVALID-ORDER-33 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L \right)$

$$H(s) = R_L$$

10.34 INVALID-ORDER-34 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{1}{C_L s}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

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

10.36 INVALID-ORDER-36 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, R_L + \frac{1}{C_L s} \right)$

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

10.37 INVALID-ORDER-37 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, L_L s + \frac{1}{C_L s} \right)$

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

10.38 INVALID-ORDER-38 $Z(s) = \left(\infty, L_2 s + \frac{1}{C_2 s}, \infty, \infty, \infty, \frac{L_L s}{C_L L_L s^2 + 1} \right)$

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

$$10.39 \quad \text{INVALID-ORDER-39} \quad Z(s) = \left(\infty, \quad L_2s + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad L_Ls + R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_2C_LL_2L_Lg_ms^4 + g_m + s^3(C_2C_LL_2R_Lg_m + C_2C_LL_L) + s^2(C_2C_LR_L + C_2L_2g_m + C_LL_Lg_m) + s(C_2 + C_LR_Lg_m)}{C_2C_LL_2g_ms^3 + C_2C_Ls^2 + C_Lg_ms}$$

$$10.40 \quad \text{INVALID-ORDER-40} \quad Z(s) = \left(\infty, \quad L_2s + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad \frac{C_LL_LR_Ls^2 + L_Ls + R_L}{C_LL_Ls^2 + 1} \right)$$

$$H(s) = \frac{C_LL_LR_Ls^2 + L_Ls + R_L}{C_LL_Ls^2 + 1}$$

$$10.41 \quad \text{INVALID-ORDER-41} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad R_L \right)$$

$$H(s) = R_L$$

$$10.42 \quad \text{INVALID-ORDER-42} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{1}{C_Ls}$$

$$10.43 \quad \text{INVALID-ORDER-43} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad \frac{R_L}{C_LR_Ls + 1} \right)$$

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

$$10.44 \quad \text{INVALID-ORDER-44} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_2C_LL_2R_Lg_ms^3 + g_m + s^2(C_2C_LR_2R_Lg_m + C_2C_LR_L + C_2L_2g_m) + s(C_2R_2g_m + C_2 + C_LR_Lg_m)}{C_2C_LL_2g_ms^3 + C_Lg_ms + s^2(C_2C_LR_2g_m + C_2C_L)}$$

$$10.45 \quad \text{INVALID-ORDER-45} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad L_Ls + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_2C_LL_2L_Lg_ms^4 + g_m + s^3(C_2C_LL_LR_2g_m + C_2C_LL_L) + s^2(C_2L_2g_m + C_LL_Lg_m) + s(C_2R_2g_m + C_2)}{C_2C_LL_2g_ms^3 + C_Lg_ms + s^2(C_2C_LR_2g_m + C_2C_L)}$$

$$10.46 \quad \text{INVALID-ORDER-46} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad \frac{L_Ls}{C_LL_Ls^2 + 1} \right)$$

$$H(s) = \frac{L_Ls}{C_LL_Ls^2 + 1}$$

$$10.47 \quad \text{INVALID-ORDER-47} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad L_Ls + R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_2C_LL_2L_Lg_ms^4 + g_m + s^3(C_2C_LL_2R_Lg_m + C_2C_LL_LR_2g_m + C_2C_LL_L) + s^2(C_2C_LR_2R_Lg_m + C_2C_LR_L + C_2L_2g_m + C_LL_Lg_m) + s(C_2R_2g_m + C_2 + C_LR_Lg_m)}{C_2C_LL_2g_ms^3 + C_Lg_ms + s^2(C_2C_LR_2g_m + C_2C_L)}$$

$$10.48 \quad \text{INVALID-ORDER-48} \quad Z(s) = \left(\infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \infty, \quad \infty, \quad \frac{C_LL_LR_Ls^2 + L_Ls + R_L}{C_LL_Ls^2 + 1} \right)$$

$$H(s) = \frac{C_LL_LR_Ls^2 + L_Ls + R_L}{C_LL_Ls^2 + 1}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, R_L \right)$

$$H(s) = R_L$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{1}{C_L s}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, \frac{R_L}{C_L R_L s + 1} \right)$

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

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

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

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

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

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

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

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, L_L s + R_L + \frac{1}{C_L s} \right)$

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

10.56 INVALID-ORDER-56 $Z(s) = \left(\infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \infty, \infty, \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_L L_L s^2 + 1} \right)$

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

10.57 INVALID-ORDER-57 $Z(s) = \left(\infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, R_L \right)$

$$H(s) = R_L$$

10.58 INVALID-ORDER-58 $Z(s) = \left(\infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \infty, \infty, \frac{1}{C_L s} \right)$

$$H(s) = \frac{1}{C_L s}$$

$$10.59 \quad \text{INVALID-ORDER-59} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{R_L}{C_LR_Ls+1} \right)$$

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

$$10.60 \quad \text{INVALID-ORDER-60} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{R_2g_m + s^3(C_2C_LL_2R_2R_Lg_m + C_2C_LL_2R_L) + s^2(C_2C_LR_2R_L + C_2L_2R_2g_m + C_2L_2) + s(C_2R_2 + C_LR_2R_Lg_m + C_LR_L) + 1}{C_2C_LR_2s^2 + s^3(C_2C_LL_2R_2g_m + C_2C_LL_2) + s(C_LR_2g_m + C_L)}$$

$$10.61 \quad \text{INVALID-ORDER-61} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, L_Ls + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{C_2C_LL_LR_2s^3 + C_2R_2s + R_2g_m + s^4(C_2C_LL_2L_LR_2g_m + C_2C_LL_2L_L) + s^2(C_2L_2R_2g_m + C_2L_2 + C_LL_LR_2g_m + C_LL_L) + 1}{C_2C_LR_2s^2 + s^3(C_2C_LL_2R_2g_m + C_2C_LL_2) + s(C_LR_2g_m + C_L)}$$

$$10.62 \quad \text{INVALID-ORDER-62} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{L_Ls}{C_LL_Ls^2+1} \right)$$

$$H(s) = \frac{L_Ls}{C_LL_Ls^2+1}$$

$$10.63 \quad \text{INVALID-ORDER-63} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, L_Ls + R_L + \frac{1}{C_Ls} \right)$$

$$H(s) = \frac{R_2g_m + s^4(C_2C_LL_2L_LR_2g_m + C_2C_LL_2L_L) + s^3(C_2C_LL_2R_2R_Lg_m + C_2C_LL_2R_L + C_2C_LL_LR_2) + s^2(C_2C_LR_2R_L + C_2L_2R_2g_m + C_2L_2 + C_LL_LR_2g_m + C_LL_L) + s(C_2R_2 + C_LR_2R_Lg_m + C_LR_L) + 1}{C_2C_LR_2s^2 + s^3(C_2C_LL_2R_2g_m + C_2C_LL_2) + s(C_LR_2g_m + C_L)}$$

$$10.64 \quad \text{INVALID-ORDER-64} \quad Z(s) = \left(\infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \infty, \infty, \frac{C_LL_LR_Ls^2+L_Ls+R_L}{C_LL_Ls^2+1} \right)$$

$$H(s) = \frac{C_LL_LR_Ls^2 + L_Ls + R_L}{C_LL_Ls^2 + 1}$$

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