

# Filter Summary Report: CG,TIA,simple,Z2,Z4

Generated by MacAnalog-Symbolix

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## Contents

<b>1</b>	<b>Examined <math>H(z)</math> for CG TIA simple Z2 Z4: <math>\frac{Z_2 Z_4 g_m + Z_4}{2 Z_2 g_m + 2}</math></b>	<b>4</b>
<b>2</b>	<b>HP</b>	<b>4</b>
<b>3</b>	<b>BP</b>	<b>4</b>
3.1	BP-1 $Z(s) = \left( \infty, R_2, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	4
3.2	BP-2 $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	4
3.3	BP-3 $Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	4
3.4	BP-4 $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	5
3.5	BP-5 $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	5
3.6	BP-6 $Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	5
3.7	BP-7 $Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	5
3.8	BP-8 $Z(s) = \left( \infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$	6
<b>4</b>	<b>LP</b>	<b>6</b>
<b>5</b>	<b>BS</b>	<b>6</b>
5.1	BS-1 $Z(s) = \left( \infty, R_2, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	6
5.2	BS-2 $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	6
5.3	BS-3 $Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	7
5.4	BS-4 $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	7
5.5	BS-5 $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	7
5.6	BS-6 $Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	8
5.7	BS-7 $Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	8
5.8	BS-8 $Z(s) = \left( \infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \frac{R_4 (C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$	8
<b>6</b>	<b>GE</b>	<b>8</b>
<b>7</b>	<b>AP</b>	<b>8</b>
<b>8</b>	<b>INVALID-NUMER</b>	<b>9</b>
<b>9</b>	<b>INVALID-WZ</b>	<b>9</b>
<b>10</b>	<b>INVALID-ORDER</b>	<b>9</b>
10.1	INVALID-ORDER-1 $Z(s) = (\infty, R_2, \infty, R_4, \infty, \infty)$	9
10.2	INVALID-ORDER-2 $Z(s) = \left( \infty, R_2, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	9
10.3	INVALID-ORDER-3 $Z(s) = \left( \infty, R_2, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	9

10.4 INVALID-ORDER-4	$Z(s) = \left( \infty, R_2, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	9
10.5 INVALID-ORDER-5	$Z(s) = \left( \infty, R_2, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$	9
10.6 INVALID-ORDER-6	$Z(s) = \left( \infty, R_2, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	9
10.7 INVALID-ORDER-7	$Z(s) = \left( \infty, R_2, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	9
10.8 INVALID-ORDER-8	$Z(s) = \left( \infty, R_2, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	9
10.9 INVALID-ORDER-9	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$	10
10.10INVALID-ORDER-10	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	10
10.11INVALID-ORDER-11	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	10
10.12INVALID-ORDER-12	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	10
10.13INVALID-ORDER-13	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$	10
10.14INVALID-ORDER-14	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	10
10.15INVALID-ORDER-15	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	10
10.16INVALID-ORDER-16	$Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	10
10.17INVALID-ORDER-17	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, R_4, \infty, \infty \right)$	10
10.18INVALID-ORDER-18	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	10
10.19INVALID-ORDER-19	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	11
10.20INVALID-ORDER-20	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	11
10.21INVALID-ORDER-21	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$	11
10.22INVALID-ORDER-22	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	11
10.23INVALID-ORDER-23	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	11
10.24INVALID-ORDER-24	$Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	11
10.25INVALID-ORDER-25	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$	11
10.26INVALID-ORDER-26	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	11
10.27INVALID-ORDER-27	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	11
10.28INVALID-ORDER-28	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	11
10.29INVALID-ORDER-29	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$	12
10.30INVALID-ORDER-30	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	12
10.31INVALID-ORDER-31	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	12
10.32INVALID-ORDER-32	$Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	12
10.33INVALID-ORDER-33	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$	12
10.34INVALID-ORDER-34	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	12
10.35INVALID-ORDER-35	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	12
10.36INVALID-ORDER-36	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	12
10.37INVALID-ORDER-37	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$	12
10.38INVALID-ORDER-38	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	12
10.39INVALID-ORDER-39	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$	13
10.40INVALID-ORDER-40	$Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$	13
10.41INVALID-ORDER-41	$Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$	13
10.42INVALID-ORDER-42	$Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$	13
10.43INVALID-ORDER-43	$Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$	13

10.44INVALID-ORDER-44	$Z(s) = \left( \infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	13
10.45INVALID-ORDER-45	$Z(s) = \left( \infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, L_4s + \frac{1}{C_4s}, \infty, \infty \right)$	13
10.46INVALID-ORDER-46	$Z(s) = \left( \infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \frac{L_4s}{C_4L_4s^2+1}, \infty, \infty \right)$	13
10.47INVALID-ORDER-47	$Z(s) = \left( \infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	13
10.48INVALID-ORDER-48	$Z(s) = \left( \infty, L_2s + R_2 + \frac{1}{C_2s}, \infty, \frac{C_4L_4R_4s^2+L_4s+R_4}{C_4L_4s^2+1}, \infty, \infty \right)$	13
10.49INVALID-ORDER-49	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, R_4, \infty, \infty \right)$	14
10.50INVALID-ORDER-50	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \frac{1}{C_4s}, \infty, \infty \right)$	14
10.51INVALID-ORDER-51	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \frac{R_4}{C_4R_4s+1}, \infty, \infty \right)$	14
10.52INVALID-ORDER-52	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	14
10.53INVALID-ORDER-53	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, L_4s + \frac{1}{C_4s}, \infty, \infty \right)$	14
10.54INVALID-ORDER-54	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \frac{L_4s}{C_4L_4s^2+1}, \infty, \infty \right)$	14
10.55INVALID-ORDER-55	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	14
10.56INVALID-ORDER-56	$Z(s) = \left( \infty, \frac{C_2L_2R_2s^2+L_2s+R_2}{C_2L_2s^2+1}, \infty, \frac{C_4L_4R_4s^2+L_4s+R_4}{C_4L_4s^2+1}, \infty, \infty \right)$	14
10.57INVALID-ORDER-57	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, R_4, \infty, \infty \right)$	14
10.58INVALID-ORDER-58	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{1}{C_4s}, \infty, \infty \right)$	14
10.59INVALID-ORDER-59	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{R_4}{C_4R_4s+1}, \infty, \infty \right)$	15
10.60INVALID-ORDER-60	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	15
10.61INVALID-ORDER-61	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, L_4s + \frac{1}{C_4s}, \infty, \infty \right)$	15
10.62INVALID-ORDER-62	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{L_4s}{C_4L_4s^2+1}, \infty, \infty \right)$	15
10.63INVALID-ORDER-63	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \infty \right)$	15
10.64INVALID-ORDER-64	$Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{C_4L_4R_4s^2+L_4s+R_4}{C_4L_4s^2+1}, \infty, \infty \right)$	15

## 11 PolynomialError

15

# 1 Examined $H(z)$ for CG TIA simple Z2 Z4: $\frac{Z_2 Z_4 g_m + Z_4}{2Z_2 g_m + 2}$

$$H(z) = \frac{Z_2 Z_4 g_m + Z_4}{2Z_2 g_m + 2}$$

## 2 HP

## 3 BP

### 3.1 BP-1 $Z(s) = \left( \infty, R_2, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

$$H(s) = \frac{L_4 R_4 s}{2C_4 L_4 R_4 s^2 + 2L_4 s + 2R_4}$$

Parameters:

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

### 3.2 BP-2 $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

$$H(s) = \frac{L_4 R_4 s}{2C_4 L_4 R_4 s^2 + 2L_4 s + 2R_4}$$

Parameters:

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

### 3.3 BP-3 $Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

$$H(s) = \frac{L_4 R_4 s}{2C_4 L_4 R_4 s^2 + 2L_4 s + 2R_4}$$

Parameters:

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

**3.4 BP-4**  $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

**Parameters:**

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

$$H(s) = \frac{L_4 R_4 s}{2 C_4 L_4 R_4 s^2 + 2 L_4 s + 2 R_4}$$

**3.5 BP-5**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

**Parameters:**

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

$$H(s) = \frac{L_4 R_4 s}{2 C_4 L_4 R_4 s^2 + 2 L_4 s + 2 R_4}$$

**3.6 BP-6**  $Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

**Parameters:**

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$   
 K-LP: 0  
 K-HP: 0  
 K-BP:  $\frac{R_4}{2}$   
 Qz: None  
 Wz: None

$$H(s) = \frac{L_4 R_4 s}{2 C_4 L_4 R_4 s^2 + 2 L_4 s + 2 R_4}$$

**3.7 BP-7**  $Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4}, \infty, \infty \right)$

**Parameters:**

Q:  $C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{1}{C_4 R_4}$

$$H(s) = \frac{L_4 R_4 s}{2 C_4 L_4 R_4 s^2 + 2 L_4 s + 2 R_4}$$

K-LP: 0  
K-HP: 0  
K-BP:  $\frac{R_4}{2}$   
Qz: None  
Wz: None

$$\mathbf{3.8 \quad BP-8} \quad Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{L_4R_4s}{C_4L_4R_4s^2+L_4s+R_4}, \infty, \infty \right)$$

**Parameters:**

Q:  $C_4R_4\sqrt{\frac{1}{C_4L_4}}$   
wo:  $\sqrt{\frac{1}{C_4L_4}}$   
bandwidth:  $\frac{1}{C_4R_4}$   
K-LP: 0  
K-HP: 0  
K-BP:  $\frac{R_4}{2}$   
Qz: None  
Wz: None

## 4 LP

## 5 BS

$$\mathbf{5.1 \quad BS-1} \quad Z(s) = \left( \infty, R_2, \infty, \frac{R_4(C_4L_4s^2+1)}{C_4L_4s^2+C_4R_4s+1}, \infty, \infty \right)$$

**Parameters:**

Q:  $\frac{L_4\sqrt{\frac{1}{C_4L_4}}}{R_4}$   
wo:  $\sqrt{\frac{1}{C_4L_4}}$   
bandwidth:  $\frac{R_4}{L_4}$   
K-LP:  $\frac{R_4}{2}$   
K-HP:  $\frac{R_4}{2}$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_4L_4}}$

$$\mathbf{5.2 \quad BS-2} \quad Z(s) = \left( \infty, \frac{1}{C_2s}, \infty, \frac{R_4(C_4L_4s^2+1)}{C_4L_4s^2+C_4R_4s+1}, \infty, \infty \right)$$

**Parameters:**

Q:  $\frac{L_4\sqrt{\frac{1}{C_4L_4}}}{R_4}$   
wo:  $\sqrt{\frac{1}{C_4L_4}}$   
bandwidth:  $\frac{R_4}{L_4}$   
K-LP:  $\frac{R_4}{2}$

$$H(s) = \frac{L_4R_4s}{2C_4L_4R_4s^2 + 2L_4s + 2R_4}$$

$$H(s) = \frac{C_4L_4R_4s^2 + R_4}{2C_4L_4s^2 + 2C_4R_4s + 2}$$

$$H(s) = \frac{C_4L_4R_4s^2 + R_4}{2C_4L_4s^2 + 2C_4R_4s + 2}$$

K-HP:  $\frac{R_4}{2}$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$\mathbf{5.3 \quad BS-3} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
bandwidth:  $\frac{R_4}{L_4}$   
K-LP:  $\frac{R_4}{2}$   
K-HP:  $\frac{R_4}{2}$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

$$\mathbf{5.4 \quad BS-4} \quad Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
bandwidth:  $\frac{R_4}{L_4}$   
K-LP:  $\frac{R_4}{2}$   
K-HP:  $\frac{R_4}{2}$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

$$\mathbf{5.5 \quad BS-5} \quad Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
bandwidth:  $\frac{R_4}{L_4}$   
K-LP:  $\frac{R_4}{2}$   
K-HP:  $\frac{R_4}{2}$   
K-BP: 0  
Qz: None  
Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

**5.6 BS-6**  $Z(s) = \left( \infty, L_2 s + R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{R_4}{L_4}$   
 K-LP:  $\frac{R_4}{2}$   
 K-HP:  $\frac{R_4}{2}$   
 K-BP: 0  
 Qz: None  
 Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

**5.7 BS-7**  $Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{R_4}{L_4}$   
 K-LP:  $\frac{R_4}{2}$   
 K-HP:  $\frac{R_4}{2}$   
 K-BP: 0  
 Qz: None  
 Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

**5.8 BS-8**  $Z(s) = \left( \infty, \frac{R_2(C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \frac{R_4(C_4 L_4 s^2 + 1)}{C_4 L_4 s^2 + C_4 R_4 s + 1}, \infty, \infty \right)$

**Parameters:**

Q:  $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4}$   
 wo:  $\sqrt{\frac{1}{C_4 L_4}}$   
 bandwidth:  $\frac{R_4}{L_4}$   
 K-LP:  $\frac{R_4}{2}$   
 K-HP:  $\frac{R_4}{2}$   
 K-BP: 0  
 Qz: None  
 Wz:  $\sqrt{\frac{1}{C_4 L_4}}$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{2 C_4 L_4 s^2 + 2 C_4 R_4 s + 2}$$

## 6 GE

## 7 AP



## 8 INVALID-NUMER

## 9 INVALID-WZ

## 10 INVALID-ORDER

10.1 INVALID-ORDER-1  $Z(s) = (\infty, R_2, \infty, R_4, \infty, \infty)$

$$H(s) = \frac{R_4}{2}$$

10.2 INVALID-ORDER-2  $Z(s) = \left(\infty, R_2, \infty, \frac{1}{C_4 s}, \infty, \infty\right)$

$$H(s) = \frac{1}{2C_4 s}$$

10.3 INVALID-ORDER-3  $Z(s) = \left(\infty, R_2, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty\right)$

$$H(s) = \frac{R_4}{2C_4 R_4 s + 2}$$

10.4 INVALID-ORDER-4  $Z(s) = \left(\infty, R_2, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty\right)$

$$H(s) = \frac{R_2 g_m + s(C_4 R_2 R_4 g_m + C_4 R_4) + 1}{s(2C_4 R_2 g_m + 2C_4)}$$

10.5 INVALID-ORDER-5  $Z(s) = \left(\infty, R_2, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty\right)$

$$H(s) = \frac{R_2 g_m + s^2(C_4 L_4 R_2 g_m + C_4 L_4) + 1}{s(2C_4 R_2 g_m + 2C_4)}$$

10.6 INVALID-ORDER-6  $Z(s) = \left(\infty, R_2, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty\right)$

$$H(s) = \frac{L_4 s}{2C_4 L_4 s^2 + 2}$$

10.7 INVALID-ORDER-7  $Z(s) = \left(\infty, R_2, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty\right)$

$$H(s) = \frac{R_2 g_m + s^2(C_4 L_4 R_2 g_m + C_4 L_4) + s(C_4 R_2 R_4 g_m + C_4 R_4) + 1}{s(2C_4 R_2 g_m + 2C_4)}$$

10.8 INVALID-ORDER-8  $Z(s) = \left(\infty, R_2, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty\right)$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{2C_4 L_4 s^2 + 2}$$

**10.9 INVALID-ORDER-9**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2}$$

**10.10 INVALID-ORDER-10**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{1}{2C_4 s}$$

**10.11 INVALID-ORDER-11**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2C_4 R_4 s + 2}$$

**10.12 INVALID-ORDER-12**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_2 C_4 R_4 s^2 + g_m + s(C_2 + C_4 R_4 g_m)}{2C_2 C_4 s^2 + 2C_4 g_m s}$$

**10.13 INVALID-ORDER-13**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_2 C_4 L_4 s^3 + C_2 s + C_4 L_4 g_m s^2 + g_m}{2C_2 C_4 s^2 + 2C_4 g_m s}$$

**10.14 INVALID-ORDER-14**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$

$$H(s) = \frac{L_4 s}{2C_4 L_4 s^2 + 2}$$

**10.15 INVALID-ORDER-15**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_2 C_4 L_4 s^3 + g_m + s^2(C_2 C_4 R_4 + C_4 L_4 g_m) + s(C_2 + C_4 R_4 g_m)}{2C_2 C_4 s^2 + 2C_4 g_m s}$$

**10.16 INVALID-ORDER-16**  $Z(s) = \left( \infty, \frac{1}{C_2 s}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{2C_4 L_4 s^2 + 2}$$

**10.17 INVALID-ORDER-17**  $Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, R_4, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2}$$

**10.18 INVALID-ORDER-18**  $Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{1}{2C_4 s}$$

$$10.19 \quad \text{INVALID-ORDER-19} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2C_4 R_4 s + 2}$$

$$10.20 \quad \text{INVALID-ORDER-20} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{C_2 C_4 R_2 R_4 s^2 + R_2 g_m + s (C_2 R_2 + C_4 R_2 R_4 g_m + C_4 R_4) + 1}{2C_2 C_4 R_2 s^2 + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.21 \quad \text{INVALID-ORDER-21} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{C_2 C_4 L_4 R_2 s^3 + C_2 R_2 s + R_2 g_m + s^2 (C_4 L_4 R_2 g_m + C_4 L_4) + 1}{2C_2 C_4 R_2 s^2 + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.22 \quad \text{INVALID-ORDER-22} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{L_4 s}{2C_4 L_4 s^2 + 2}$$

$$10.23 \quad \text{INVALID-ORDER-23} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{C_2 C_4 L_4 R_2 s^3 + R_2 g_m + s^2 (C_2 C_4 R_2 R_4 + C_4 L_4 R_2 g_m + C_4 L_4) + s (C_2 R_2 + C_4 R_2 R_4 g_m + C_4 R_4) + 1}{2C_2 C_4 R_2 s^2 + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.24 \quad \text{INVALID-ORDER-24} \quad Z(s) = \left( \infty, \frac{R_2}{C_2 R_2 s + 1}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{2C_4 L_4 s^2 + 2}$$

$$10.25 \quad \text{INVALID-ORDER-25} \quad Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2}$$

$$10.26 \quad \text{INVALID-ORDER-26} \quad Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{1}{2C_4 s}$$

$$10.27 \quad \text{INVALID-ORDER-27} \quad Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2C_4 R_4 s + 2}$$

$$10.28 \quad \text{INVALID-ORDER-28} \quad Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{g_m + s^2 (C_2 C_4 R_2 R_4 g_m + C_2 C_4 R_4) + s (C_2 R_2 g_m + C_2 + C_4 R_4 g_m)}{2C_4 g_m s + s^2 (2C_2 C_4 R_2 g_m + 2C_2 C_4)}$$

**10.29 INVALID-ORDER-29**  $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_4 L_4 g_m s^2 + g_m + s^3 (C_2 C_4 L_4 R_2 g_m + C_2 C_4 L_4) + s (C_2 R_2 g_m + C_2)}{2 C_4 g_m s + s^2 (2 C_2 C_4 R_2 g_m + 2 C_2 C_4)}$$

**10.30 INVALID-ORDER-30**  $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$

$$H(s) = \frac{L_4 s}{2 C_4 L_4 s^2 + 2}$$

**10.31 INVALID-ORDER-31**  $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{g_m + s^3 (C_2 C_4 L_4 R_2 g_m + C_2 C_4 L_4) + s^2 (C_2 C_4 R_2 R_4 g_m + C_2 C_4 R_4 + C_4 L_4 g_m) + s (C_2 R_2 g_m + C_2 + C_4 R_4 g_m)}{2 C_4 g_m s + s^2 (2 C_2 C_4 R_2 g_m + 2 C_2 C_4)}$$

**10.32 INVALID-ORDER-32**  $Z(s) = \left( \infty, R_2 + \frac{1}{C_2 s}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{2 C_4 L_4 s^2 + 2}$$

**10.33 INVALID-ORDER-33**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, R_4, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2}$$

**10.34 INVALID-ORDER-34**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{1}{2 C_4 s}$$

**10.35 INVALID-ORDER-35**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2 C_4 R_4 s + 2}$$

**10.36 INVALID-ORDER-36**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_2 C_4 L_2 R_4 g_m s^3 + g_m + s^2 (C_2 C_4 R_4 + C_2 L_2 g_m) + s (C_2 + C_4 R_4 g_m)}{2 C_2 C_4 L_2 g_m s^3 + 2 C_2 C_4 s^2 + 2 C_4 g_m s}$$

**10.37 INVALID-ORDER-37**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$

$$H(s) = \frac{C_2 C_4 L_2 L_4 g_m s^4 + C_2 C_4 L_4 s^3 + C_2 s + g_m + s^2 (C_2 L_2 g_m + C_4 L_4 g_m)}{2 C_2 C_4 L_2 g_m s^3 + 2 C_2 C_4 s^2 + 2 C_4 g_m s}$$

**10.38 INVALID-ORDER-38**  $Z(s) = \left( \infty, L_2 s + \frac{1}{C_2 s}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$

$$H(s) = \frac{L_4 s}{2 C_4 L_4 s^2 + 2}$$

$$10.39 \quad \text{INVALID-ORDER-39} \quad Z(s) = \left( \infty, \quad L_2s + \frac{1}{C_2s}, \quad \infty, \quad L_4s + R_4 + \frac{1}{C_4s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2C_4L_2L_4g_ms^4 + g_m + s^3 (C_2C_4L_2R_4g_m + C_2C_4L_4) + s^2 (C_2C_4R_4 + C_2L_2g_m + C_4L_4g_m) + s (C_2 + C_4R_4g_m)}{2C_2C_4L_2g_ms^3 + 2C_2C_4s^2 + 2C_4g_ms}$$

$$10.40 \quad \text{INVALID-ORDER-40} \quad Z(s) = \left( \infty, \quad L_2s + \frac{1}{C_2s}, \quad \infty, \quad \frac{C_4L_4R_4s^2 + L_4s + R_4}{C_4L_4s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_4L_4R_4s^2 + L_4s + R_4}{2C_4L_4s^2 + 2}$$

$$10.41 \quad \text{INVALID-ORDER-41} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad R_4, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4}{2}$$

$$10.42 \quad \text{INVALID-ORDER-42} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \frac{1}{C_4s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{1}{2C_4s}$$

$$10.43 \quad \text{INVALID-ORDER-43} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \frac{R_4}{C_4R_4s + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{R_4}{2C_4R_4s + 2}$$

$$10.44 \quad \text{INVALID-ORDER-44} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad R_4 + \frac{1}{C_4s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2C_4L_2R_4g_ms^3 + g_m + s^2 (C_2C_4R_2R_4g_m + C_2C_4R_4 + C_2L_2g_m) + s (C_2R_2g_m + C_2 + C_4R_4g_m)}{2C_2C_4L_2g_ms^3 + 2C_4g_ms + s^2 (2C_2C_4R_2g_m + 2C_2C_4)}$$

$$10.45 \quad \text{INVALID-ORDER-45} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad L_4s + \frac{1}{C_4s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2C_4L_2L_4g_ms^4 + g_m + s^3 (C_2C_4L_4R_2g_m + C_2C_4L_4) + s^2 (C_2L_2g_m + C_4L_4g_m) + s (C_2R_2g_m + C_2)}{2C_2C_4L_2g_ms^3 + 2C_4g_ms + s^2 (2C_2C_4R_2g_m + 2C_2C_4)}$$

$$10.46 \quad \text{INVALID-ORDER-46} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \frac{L_4s}{C_4L_4s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{L_4s}{2C_4L_4s^2 + 2}$$

$$10.47 \quad \text{INVALID-ORDER-47} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad L_4s + R_4 + \frac{1}{C_4s}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_2C_4L_2L_4g_ms^4 + g_m + s^3 (C_2C_4L_2R_4g_m + C_2C_4L_4R_2g_m + C_2C_4L_4) + s^2 (C_2C_4R_2R_4g_m + C_2C_4R_4 + C_2L_2g_m + C_4L_4g_m) + s (C_2R_2g_m + C_2 + C_4R_4g_m)}{2C_2C_4L_2g_ms^3 + 2C_4g_ms + s^2 (2C_2C_4R_2g_m + 2C_2C_4)}$$

$$10.48 \quad \text{INVALID-ORDER-48} \quad Z(s) = \left( \infty, \quad L_2s + R_2 + \frac{1}{C_2s}, \quad \infty, \quad \frac{C_4L_4R_4s^2 + L_4s + R_4}{C_4L_4s^2 + 1}, \quad \infty, \quad \infty \right)$$

$$H(s) = \frac{C_4L_4R_4s^2 + L_4s + R_4}{2C_4L_4s^2 + 2}$$

$$10.49 \quad \text{INVALID-ORDER-49} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, R_4, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2}$$

$$10.50 \quad \text{INVALID-ORDER-50} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{1}{2C_4 s}$$

$$10.51 \quad \text{INVALID-ORDER-51} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{R_4}{C_4 R_4 s + 1}, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2C_4 R_4 s + 2}$$

$$10.52 \quad \text{INVALID-ORDER-52} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^3 (C_2 C_4 L_2 R_2 R_4 g_m + C_2 C_4 L_2 R_4) + s^2 (C_2 L_2 R_2 g_m + C_2 L_2 + C_4 L_2 R_4 g_m) + s (C_4 R_2 R_4 g_m + C_4 R_4 + L_2 g_m) + 1}{2C_4 L_2 g_m s^2 + s^3 (2C_2 C_4 L_2 R_2 g_m + 2C_2 C_4 L_2) + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.53 \quad \text{INVALID-ORDER-53} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, L_4 s + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{C_4 L_2 L_4 g_m s^3 + L_2 g_m s + R_2 g_m + s^4 (C_2 C_4 L_2 L_4 R_2 g_m + C_2 C_4 L_2 L_4) + s^2 (C_2 L_2 R_2 g_m + C_2 L_2 + C_4 L_4 R_2 g_m + C_4 L_4) + 1}{2C_4 L_2 g_m s^2 + s^3 (2C_2 C_4 L_2 R_2 g_m + 2C_2 C_4 L_2) + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.54 \quad \text{INVALID-ORDER-54} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{L_4 s}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{L_4 s}{2C_4 L_4 s^2 + 2}$$

$$10.55 \quad \text{INVALID-ORDER-55} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, L_4 s + R_4 + \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{R_2 g_m + s^4 (C_2 C_4 L_2 L_4 R_2 g_m + C_2 C_4 L_2 L_4) + s^3 (C_2 C_4 L_2 R_2 R_4 g_m + C_2 C_4 L_2 R_4 + C_4 L_2 L_4 g_m) + s^2 (C_2 L_2 R_2 g_m + C_2 L_2 + C_4 L_2 R_4 g_m + C_4 L_4 R_2 g_m + C_4 L_4) + s (C_4 R_2 R_4 g_m + C_4 R_4 + L_2 g_m) + 1}{2C_4 L_2 g_m s^2 + s^3 (2C_2 C_4 L_2 R_2 g_m + 2C_2 C_4 L_2) + s (2C_4 R_2 g_m + 2C_4)}$$

$$10.56 \quad \text{INVALID-ORDER-56} \quad Z(s) = \left( \infty, \frac{C_2 L_2 R_2 s^2 + L_2 s + R_2}{C_2 L_2 s^2 + 1}, \infty, \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_4 L_4 s^2 + 1}, \infty, \infty \right)$$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{2C_4 L_4 s^2 + 2}$$

$$10.57 \quad \text{INVALID-ORDER-57} \quad Z(s) = \left( \infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, R_4, \infty, \infty \right)$$

$$H(s) = \frac{R_4}{2}$$

$$10.58 \quad \text{INVALID-ORDER-58} \quad Z(s) = \left( \infty, \frac{R_2 (C_2 L_2 s^2 + 1)}{C_2 L_2 s^2 + C_2 R_2 s + 1}, \infty, \frac{1}{C_4 s}, \infty, \infty \right)$$

$$H(s) = \frac{1}{2C_4 s}$$

**10.59 INVALID-ORDER-59**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{R_4}{C_4R_4s+1}, \infty, \infty \right)$

$$H(s) = \frac{R_4}{2C_4R_4s+2}$$

**10.60 INVALID-ORDER-60**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, R_4 + \frac{1}{C_4s}, \infty, \infty \right)$

$$H(s) = \frac{R_2g_m + s^3(C_2C_4L_2R_2R_4g_m + C_2C_4L_2R_4) + s^2(C_2C_4R_2R_4 + C_2L_2R_2g_m + C_2L_2) + s(C_2R_2 + C_4R_2R_4g_m + C_4R_4) + 1}{2C_2C_4R_2s^2 + s^3(2C_2C_4L_2R_2g_m + 2C_2C_4L_2) + s(2C_4R_2g_m + 2C_4)}$$

**10.61 INVALID-ORDER-61**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, L_4s + \frac{1}{C_4s}, \infty, \infty \right)$

$$H(s) = \frac{C_2C_4L_4R_2s^3 + C_2R_2s + R_2g_m + s^4(C_2C_4L_2L_4R_2g_m + C_2C_4L_2L_4) + s^2(C_2L_2R_2g_m + C_2L_2 + C_4L_4R_2g_m + C_4L_4) + 1}{2C_2C_4R_2s^2 + s^3(2C_2C_4L_2R_2g_m + 2C_2C_4L_2) + s(2C_4R_2g_m + 2C_4)}$$

**10.62 INVALID-ORDER-62**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{L_4s}{C_4L_4s^2+1}, \infty, \infty \right)$

$$H(s) = \frac{L_4s}{2C_4L_4s^2+2}$$

**10.63 INVALID-ORDER-63**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, L_4s + R_4 + \frac{1}{C_4s}, \infty, \infty \right)$

$$H(s) = \frac{R_2g_m + s^4(C_2C_4L_2L_4R_2g_m + C_2C_4L_2L_4) + s^3(C_2C_4L_2R_2R_4g_m + C_2C_4L_2R_4 + C_2C_4L_4R_2) + s^2(C_2C_4R_2R_4 + C_2L_2R_2g_m + C_2L_2 + C_4L_4R_2g_m + C_4L_4) + s(C_2R_2 + C_4R_2R_4g_m + C_4R_4) + 1}{2C_2C_4R_2s^2 + s^3(2C_2C_4L_2R_2g_m + 2C_2C_4L_2) + s(2C_4R_2g_m + 2C_4)}$$

**10.64 INVALID-ORDER-64**  $Z(s) = \left( \infty, \frac{R_2(C_2L_2s^2+1)}{C_2L_2s^2+C_2R_2s+1}, \infty, \frac{C_4L_4R_4s^2+L_4s+R_4}{C_4L_4s^2+1}, \infty, \infty \right)$

$$H(s) = \frac{C_4L_4R_4s^2 + L_4s + R_4}{2C_4L_4s^2+2}$$

## 11 PolynomialError