

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

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Contents

1	Examined $H(z)$ for CG TIA simple Z1 Z3:	$\frac{Z_1 Z_3 Z_L g_m}{Z_1 Z_3 g_m + Z_1 Z_L g_m + Z_3 + Z_L}$	5
2	HP		5
3	BP		5
3.1	BP-1	$Z(s) = \left(R_1, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$	5
3.2	BP-2	$Z(s) = \left(R_1, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$	5
3.3	BP-3	$Z(s) = \left(L_1 s, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$	5
3.4	BP-4	$Z(s) = \left(L_1 s, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$	6
3.5	BP-5	$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty \right)$	6
3.6	BP-6	$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, R_3, \infty, \infty \right)$	6
4	LP		6
4.1	LP-1	$Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$	7
4.2	LP-2	$Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$	7
4.3	LP-3	$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$	7
4.4	LP-4	$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$	7
5	BS		8
5.1	BS-1	$Z(s) = \left(R_1, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$	8
5.2	BS-2	$Z(s) = \left(R_1, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$	8
5.3	BS-3	$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty \right)$	8
5.4	BS-4	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, R_3, \infty, \infty \right)$	9
6	GE		9
6.1	GE-1	$Z(s) = \left(R_1, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	9
6.2	GE-2	$Z(s) = \left(R_1, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$	9
6.3	GE-3	$Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty \right)$	10
6.4	GE-4	$Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty \right)$	10
7	AP		10
8	INVALID-NUMER		10
8.1	INVALID-NUMER-1	$Z(s) = \left(L_1 s, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	11
8.2	INVALID-NUMER-2	$Z(s) = \left(\frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	11
8.3	INVALID-NUMER-3	$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	11
8.4	INVALID-NUMER-4	$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$	12
8.5	INVALID-NUMER-5	$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$	12

9	INVALID-WZ	12
9.1	INVALID-WZ-1 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	12
10	INVALID-ORDER	13
10.1	INVALID-ORDER-1 $Z(s) = (R_1, \infty, R_3, \infty, \infty)$	13
10.2	INVALID-ORDER-2 $Z(s) = \left(R_1, \infty, \frac{1}{C_3s}, \infty, \infty\right)$	13
10.3	INVALID-ORDER-3 $Z(s) = \left(R_1, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty\right)$	13
10.4	INVALID-ORDER-4 $Z(s) = \left(R_1, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	13
10.5	INVALID-ORDER-5 $Z(s) = (L_1s, \infty, R_3, \infty, \infty)$	13
10.6	INVALID-ORDER-6 $Z(s) = \left(L_1s, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty\right)$	13
10.7	INVALID-ORDER-7 $Z(s) = \left(L_1s, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty\right)$	13
10.8	INVALID-ORDER-8 $Z(s) = \left(L_1s, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	13
10.9	INVALID-ORDER-9 $Z(s) = \left(L_1s, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty\right)$	13
10.10	INVALID-ORDER-10 $Z(s) = \left(L_1s, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty\right)$	14
10.11	INVALID-ORDER-11 $Z(s) = \left(L_1s, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty\right)$	14
10.12	INVALID-ORDER-12 $Z(s) = \left(\frac{1}{C_1s}, \infty, R_3, \infty, \infty\right)$	14
10.13	INVALID-ORDER-13 $Z(s) = \left(\frac{1}{C_1s}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty\right)$	14
10.14	INVALID-ORDER-14 $Z(s) = \left(\frac{1}{C_1s}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty\right)$	14
10.15	INVALID-ORDER-15 $Z(s) = \left(\frac{1}{C_1s}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	14
10.16	INVALID-ORDER-16 $Z(s) = \left(\frac{1}{C_1s}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty\right)$	14
10.17	INVALID-ORDER-17 $Z(s) = \left(\frac{1}{C_1s}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty\right)$	14
10.18	INVALID-ORDER-18 $Z(s) = \left(\frac{1}{C_1s}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty\right)$	14
10.19	INVALID-ORDER-19 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, R_3, \infty, \infty\right)$	15
10.20	INVALID-ORDER-20 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty\right)$	15
10.21	INVALID-ORDER-21 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty\right)$	15
10.22	INVALID-ORDER-22 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	15
10.23	INVALID-ORDER-23 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty\right)$	15
10.24	INVALID-ORDER-24 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty\right)$	15
10.25	INVALID-ORDER-25 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty\right)$	15
10.26	INVALID-ORDER-26 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, R_3, \infty, \infty\right)$	15
10.27	INVALID-ORDER-27 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty\right)$	15
10.28	INVALID-ORDER-28 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty\right)$	15
10.29	INVALID-ORDER-29 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	16
10.30	INVALID-ORDER-30 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty\right)$	16
10.31	INVALID-ORDER-31 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty\right)$	16
10.32	INVALID-ORDER-32 $Z(s) = \left(R_1 + \frac{1}{C_1s}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty\right)$	16
10.33	INVALID-ORDER-33 $Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{1}{C_3s}, \infty, \infty\right)$	16
10.34	INVALID-ORDER-34 $Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty\right)$	16
10.35	INVALID-ORDER-35 $Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty\right)$	16
10.36	INVALID-ORDER-36 $Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty\right)$	16
10.37	INVALID-ORDER-37 $Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty\right)$	16

10.38INVALID-ORDER-38	$Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	17
10.39INVALID-ORDER-39	$Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty \right)$	17
10.40INVALID-ORDER-40	$Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty \right)$	17
10.41INVALID-ORDER-41	$Z(s) = \left(L_1s + \frac{1}{C_1s}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty \right)$	17
10.42INVALID-ORDER-42	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{1}{C_3s}, \infty, \infty \right)$	17
10.43INVALID-ORDER-43	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty \right)$	17
10.44INVALID-ORDER-44	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	17
10.45INVALID-ORDER-45	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty \right)$	17
10.46INVALID-ORDER-46	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty \right)$	17
10.47INVALID-ORDER-47	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	17
10.48INVALID-ORDER-48	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty \right)$	18
10.49INVALID-ORDER-49	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty \right)$	18
10.50INVALID-ORDER-50	$Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty \right)$	18
10.51INVALID-ORDER-51	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{1}{C_3s}, \infty, \infty \right)$	18
10.52INVALID-ORDER-52	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty \right)$	18
10.53INVALID-ORDER-53	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	18
10.54INVALID-ORDER-54	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty \right)$	18
10.55INVALID-ORDER-55	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty \right)$	18
10.56INVALID-ORDER-56	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	18
10.57INVALID-ORDER-57	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty \right)$	19
10.58INVALID-ORDER-58	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty \right)$	19
10.59INVALID-ORDER-59	$Z(s) = \left(L_1s + R_1 + \frac{1}{C_1s}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty \right)$	19
10.60INVALID-ORDER-60	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{1}{C_3s}, \infty, \infty \right)$	19
10.61INVALID-ORDER-61	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty \right)$	19
10.62INVALID-ORDER-62	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	19
10.63INVALID-ORDER-63	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty \right)$	19
10.64INVALID-ORDER-64	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty \right)$	19
10.65INVALID-ORDER-65	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	19
10.66INVALID-ORDER-66	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty \right)$	19
10.67INVALID-ORDER-67	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty \right)$	20
10.68INVALID-ORDER-68	$Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2+L_1s+R_1}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty \right)$	20
10.69INVALID-ORDER-69	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, \frac{1}{C_3s}, \infty, \infty \right)$	20
10.70INVALID-ORDER-70	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty \right)$	20
10.71INVALID-ORDER-71	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	20
10.72INVALID-ORDER-72	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty \right)$	20
10.73INVALID-ORDER-73	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty \right)$	20
10.74INVALID-ORDER-74	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty \right)$	20
10.75INVALID-ORDER-75	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty \right)$	20
10.76INVALID-ORDER-76	$Z(s) = \left(\frac{C_1L_1R_1s^2+L_1s+R_1}{C_1L_1s^2+1}, \infty, \frac{C_3L_3R_3s^2+L_3s+R_3}{C_3L_3s^2+1}, \infty, \infty \right)$	21

10.77INVALID-ORDER-77	$Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$	21
10.78INVALID-ORDER-78	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$	21
10.79INVALID-ORDER-79	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$	21
10.80INVALID-ORDER-80	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	21
10.81INVALID-ORDER-81	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$	21
10.82INVALID-ORDER-82	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$	21
10.83INVALID-ORDER-83	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$	21
10.84INVALID-ORDER-84	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$	21
10.85INVALID-ORDER-85	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$	22
10.86INVALID-ORDER-86	$Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$	22
11 PolynomialError		22

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

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

2 HP

3 BP

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

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

Parameters:

Q: $C_3 Z_L \sqrt{\frac{1}{C_3 L_3}}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{1}{C_3 Z_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_1 Z_L g_m}{R_1 g_m + 1}$
Qz: None
Wz: None

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

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

Parameters:

Q: $\frac{C_3 R_3 Z_L \sqrt{\frac{1}{C_3 L_3}}}{R_3 + Z_L}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_3 + Z_L}{C_3 R_3 Z_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L}$
Qz: None
Wz: None

3.3 BP-3 $Z(s) = \left(L_1 s, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

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

Parameters:

Q: $\frac{C_3 L_1 Z_L g_m \sqrt{\frac{1}{C_3 L_1 Z_L g_m}}}{C_3 Z_L + L_1 g_m}$
wo: $\sqrt{\frac{1}{C_3 L_1 Z_L g_m}}$
bandwidth: $\frac{C_3 Z_L + L_1 g_m}{C_3 L_1 Z_L g_m}$
K-LP: 0
K-HP: 0
K-BP: $\frac{L_1 Z_L g_m}{C_3 Z_L + L_1 g_m}$
Qz: None

Wz: None

3.4 BP-4 $Z(s) = \left(L_1 s, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

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

Parameters:

Q: $\frac{C_3 L_1 R_3 Z_L g_m \sqrt{\frac{1}{C_3 L_1 Z_L g_m} + \frac{1}{C_3 L_1 R_3 g_m}}}{C_3 R_3 Z_L + L_1 R_3 g_m + L_1 Z_L g_m}$
 wo: $\sqrt{\frac{R_3 + Z_L}{C_3 L_1 R_3 Z_L g_m}}$
 bandwidth: $\frac{\sqrt{\frac{R_3 + Z_L}{C_3 L_1 R_3 Z_L g_m}} (C_3 R_3 Z_L + L_1 R_3 g_m + L_1 Z_L g_m)}{C_3 L_1 R_3 Z_L g_m \sqrt{\frac{1}{C_3 L_1 Z_L g_m} + \frac{1}{C_3 L_1 R_3 g_m}}}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{L_1 R_3 Z_L g_m}{C_3 R_3 Z_L + L_1 R_3 g_m + L_1 Z_L g_m}$
 Qz: None
 Wz: None

3.5 BP-5 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty \right)$

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

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: $\frac{R_3 Z_L}{R_3 + Z_L}$
 Qz: None
 Wz: None

3.6 BP-6 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, R_3, \infty, \infty \right)$

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

Parameters:

Q: $\frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1}$
 wo: $\sqrt{\frac{1}{C_1 L_1}}$
 bandwidth: $\frac{R_1 g_m + 1}{C_1 R_1}$
 K-LP: 0
 K-HP: 0
 K-BP: $\frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L}$
 Qz: None
 Wz: None

4 LP

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

Parameters:

Q: $\frac{C_1 C_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L}}}{C_1 + C_3 Z_L g_m}$
 wo: $\sqrt{\frac{g_m}{C_1 C_3 Z_L}}$
 bandwidth: $\frac{C_1 + C_3 Z_L g_m}{C_1 C_3 Z_L}$
 K-LP: Z_L
 K-HP: 0
 K-BP: 0
 Qz: None
 Wz: None

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

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

Parameters:

Q: $\frac{C_1 C_3 R_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{g_m}{C_1 C_3 R_3}}}{C_1 R_3 + C_1 Z_L + C_3 R_3 Z_L g_m}$
 wo: $\sqrt{\frac{R_3 g_m + Z_L g_m}{C_1 C_3 R_3 Z_L}}$
 bandwidth: $\frac{\sqrt{\frac{R_3 g_m + Z_L g_m}{C_1 C_3 R_3 Z_L}} (C_1 R_3 + C_1 Z_L + C_3 R_3 Z_L g_m)}{C_1 C_3 R_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{g_m}{C_1 C_3 R_3}}}$
 K-LP: $\frac{R_3 Z_L}{R_3 + Z_L}$
 K-HP: 0
 K-BP: 0
 Qz: None
 Wz: None

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

4.3 LP-3 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

Parameters:

Q: $\frac{C_1 C_3 R_1 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{1}{C_1 C_3 R_1 Z_L}}}{C_1 R_1 + C_3 R_1 Z_L g_m + C_3 Z_L}$
 wo: $\sqrt{\frac{R_1 g_m + 1}{C_1 C_3 R_1 Z_L}}$
 bandwidth: $\frac{\sqrt{\frac{R_1 g_m + 1}{C_1 C_3 R_1 Z_L}} (C_1 R_1 + C_3 R_1 Z_L g_m + C_3 Z_L)}{C_1 C_3 R_1 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{1}{C_1 C_3 R_1 Z_L}}}$
 K-LP: $\frac{R_1 Z_L g_m}{R_1 g_m + 1}$
 K-HP: 0
 K-BP: 0
 Qz: None
 Wz: None

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

4.4 LP-4 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

Parameters:

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

$$\begin{aligned}
\text{Q: } & \frac{C_1 C_3 R_1 R_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{g_m}{C_1 C_3 R_3} + \frac{1}{C_1 C_3 R_1 Z_L} + \frac{1}{C_1 C_3 R_1 R_3}}}{C_1 R_1 R_3 + C_1 R_1 Z_L + C_3 R_1 R_3 Z_L g_m + C_3 R_3 Z_L} \\
\text{wo: } & \sqrt{\frac{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L}{C_1 C_3 R_1 R_3 Z_L}} \\
\text{bandwidth: } & \frac{\sqrt{\frac{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L}{C_1 C_3 R_1 R_3 Z_L}} (C_1 R_1 R_3 + C_1 R_1 Z_L + C_3 R_1 R_3 Z_L g_m + C_3 R_3 Z_L)}{C_1 C_3 R_1 R_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 Z_L} + \frac{g_m}{C_1 C_3 R_3} + \frac{1}{C_1 C_3 R_1 Z_L} + \frac{1}{C_1 C_3 R_1 R_3}}} \\
\text{K-LP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-HP: } & 0 \\
\text{K-BP: } & 0 \\
\text{Qz: } & \text{None} \\
\text{Wz: } & \text{None}
\end{aligned}$$

5 BS

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

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

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{Z_L} \\
\text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\
\text{bandwidth: } & \frac{Z_L}{L_3} \\
\text{K-LP: } & \frac{R_1 Z_L g_m}{R_1 g_m + 1} \\
\text{K-HP: } & \frac{R_1 Z_L g_m}{R_1 g_m + 1} \\
\text{K-BP: } & 0 \\
\text{Qz: } & \text{None} \\
\text{Wz: } & \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

$$5.2 \quad \text{BS-2 } Z(s) = \left(R_1, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$$

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

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{L_3 R_3 \sqrt{\frac{1}{C_3 L_3}} + L_3 Z_L \sqrt{\frac{1}{C_3 L_3}}}{R_3 Z_L} \\
\text{wo: } & \sqrt{\frac{1}{C_3 L_3}} \\
\text{bandwidth: } & \frac{R_3 Z_L \sqrt{\frac{1}{C_3 L_3}}}{L_3 R_3 \sqrt{\frac{1}{C_3 L_3}} + L_3 Z_L \sqrt{\frac{1}{C_3 L_3}}} \\
\text{K-LP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-HP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-BP: } & 0 \\
\text{Qz: } & \text{None} \\
\text{Wz: } & \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

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

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

Parameters:

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

$$\begin{aligned}
&\text{wo: } \sqrt{\frac{1}{C_1 L_1}} \\
&\text{bandwidth: } \frac{1}{L_1 g_m} \\
&\text{K-LP: } \frac{R_3 Z_L}{R_3 + Z_L} \\
&\text{K-HP: } \frac{R_3 Z_L}{R_3 + Z_L} \\
&\text{K-BP: } 0 \\
&\text{Qz: None} \\
&\text{Wz: } \sqrt{\frac{1}{C_1 L_1}}
\end{aligned}$$

$$\mathbf{5.4 \quad BS-4} \quad Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad R_3, \quad \infty, \quad \infty \right)$$

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

Parameters:

$$\begin{aligned}
&\text{Q: } \frac{L_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + L_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1} \\
&\text{wo: } \sqrt{\frac{1}{C_1 L_1}} \\
&\text{bandwidth: } \frac{R_1 \sqrt{\frac{1}{C_1 L_1}}}{L_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + L_1 \sqrt{\frac{1}{C_1 L_1}}} \\
&\text{K-LP: } \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
&\text{K-HP: } \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
&\text{K-BP: } 0 \\
&\text{Qz: None} \\
&\text{Wz: } \sqrt{\frac{1}{C_1 L_1}}
\end{aligned}$$

6 GE

$$\mathbf{6.1 \quad GE-1} \quad Z(s) = \left(R_1, \quad \infty, \quad L_3 s + R_3 + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

Parameters:

$$\begin{aligned}
&\text{Q: } \frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3 + Z_L} \\
&\text{wo: } \sqrt{\frac{1}{C_3 L_3}} \\
&\text{bandwidth: } \frac{R_3 + Z_L}{L_3} \\
&\text{K-LP: } \frac{R_1 Z_L g_m}{R_1 g_m + 1} \\
&\text{K-HP: } \frac{R_1 Z_L g_m}{R_1 g_m + 1} \\
&\text{K-BP: } \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
&\text{Qz: } \frac{L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_3} \\
&\text{Wz: } \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

$$\mathbf{6.2 \quad GE-2} \quad Z(s) = \left(R_1, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

Parameters:

$$\begin{aligned}
&\text{Q: } C_3 R_3 \sqrt{\frac{1}{C_3 L_3}} + C_3 Z_L \sqrt{\frac{1}{C_3 L_3}} \\
&\text{wo: } \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

$$\begin{aligned}
\text{bandwidth: } & \frac{\sqrt{\frac{1}{C_3 L_3}}}{C_3 R_3 \sqrt{\frac{1}{C_3 L_3}} + C_3 Z_L \sqrt{\frac{1}{C_3 L_3}}} \\
\text{K-LP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-HP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-BP: } & \frac{R_1 Z_L g_m}{R_1 g_m + 1} \\
\text{Qz: } & C_3 R_3 \sqrt{\frac{1}{C_3 L_3}} \\
\text{Wz: } & \sqrt{\frac{1}{C_3 L_3}}
\end{aligned}$$

6.3 GE-3 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty \right)$

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

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{L_1 g_m \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\
\text{wo: } & \sqrt{\frac{1}{C_1 L_1}} \\
\text{bandwidth: } & \frac{R_1 g_m + 1}{L_1 g_m} \\
\text{K-LP: } & \frac{R_3 Z_L}{R_3 + Z_L} \\
\text{K-HP: } & \frac{R_3 Z_L}{R_3 + Z_L} \\
\text{K-BP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{Qz: } & \frac{L_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1} \\
\text{Wz: } & \sqrt{\frac{1}{C_1 L_1}}
\end{aligned}$$

6.4 GE-4 $Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty \right)$

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

Parameters:

$$\begin{aligned}
\text{Q: } & \frac{C_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m} \\
\text{wo: } & \sqrt{\frac{1}{C_1 L_1}} \\
\text{bandwidth: } & \frac{g_m \sqrt{\frac{1}{C_1 L_1}}}{C_1 R_1 g_m \sqrt{\frac{1}{C_1 L_1}} + C_1 \sqrt{\frac{1}{C_1 L_1}}} \\
\text{K-LP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-HP: } & \frac{R_1 R_3 Z_L g_m}{R_1 R_3 g_m + R_1 Z_L g_m + R_3 + Z_L} \\
\text{K-BP: } & \frac{R_3 Z_L}{R_3 + Z_L} \\
\text{Qz: } & C_1 R_1 \sqrt{\frac{1}{C_1 L_1}} \\
\text{Wz: } & \sqrt{\frac{1}{C_1 L_1}}
\end{aligned}$$

7 AP

8 INVALID-NUMER

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

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

Parameters:

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

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

bandwidth: $\frac{(C_3 R_3 + C_3 Z_L + L_1 g_m) \sqrt{\frac{1}{C_3 L_1 R_3 g_m + C_3 L_1 Z_L g_m}}}{C_3 L_1 R_3 g_m \sqrt{\frac{1}{C_3 L_1 R_3 g_m + C_3 L_1 Z_L g_m}} + C_3 L_1 Z_L g_m \sqrt{\frac{1}{C_3 L_1 R_3 g_m + C_3 L_1 Z_L g_m}}}$

K-LP: 0

K-HP: $\frac{R_3 Z_L}{R_3 + Z_L}$

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

Qz: None

Wz: None

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

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

Parameters:

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

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

bandwidth: $\frac{\sqrt{\frac{g_m}{C_1 C_3 R_3 + C_1 C_3 Z_L}} (C_1 + C_3 R_3 g_m + C_3 Z_L g_m)}{C_1 C_3 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_3 + C_1 C_3 Z_L}} + C_1 C_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 R_3 + C_1 C_3 Z_L}}}$

K-LP: Z_L

K-HP: 0

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

Qz: None

Wz: None

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

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

Parameters:

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

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

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

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

K-HP: 0

K-BP: $\frac{C_3 R_1 R_3 Z_L g_m \sqrt{\frac{g_m}{C_1 C_3 R_3 + C_1 C_3 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}}{C_1 R_1 \sqrt{\frac{R_1 g_m}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L} + C_3 R_1 R_3 g_m \sqrt{\frac{R_1 g_m}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L} + C_3 R_1 Z_L g_m \sqrt{\frac{R_1 g_m}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L} + C_3 R_3 \sqrt{\frac{R_1 g_m}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L} + C_3 Z_L \sqrt{\frac{R_1 g_m}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}} + \frac{1}{C_1 C_3 R_1 R_3 + C_1 C_3 R_1 Z_L}}$

Qz: None

Wz: None

8.4 INVALID-NUMER-4 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

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

Parameters:

$$\text{Q: } \frac{C_1 C_3 R_1 Z_L g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 Z_L g_m + C_1 C_3 Z_L}} + C_1 C_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 R_1 Z_L g_m + C_1 C_3 Z_L}}}{C_1 R_1 g_m + C_1 + C_3 Z_L g_m}$$

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

$$\text{bandwidth: } \frac{\sqrt{\frac{g_m}{C_1 C_3 R_1 Z_L g_m + C_1 C_3 Z_L}} (C_1 R_1 g_m + C_1 + C_3 Z_L g_m)}{C_1 C_3 R_1 Z_L g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 Z_L g_m + C_1 C_3 Z_L}} + C_1 C_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 R_1 Z_L g_m + C_1 C_3 Z_L}}}$$

K-LP: Z_L

K-HP: 0

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

Qz: None

Wz: None

8.5 INVALID-NUMER-5 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

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

Parameters:

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

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

$$\text{bandwidth: } \frac{\sqrt{\frac{R_3 g_m + Z_L g_m}{C_1 C_3 R_1 R_3 Z_L g_m + C_1 C_3 R_3 Z_L}} (C_1 R_1 R_3 g_m + C_1 R_1 Z_L g_m + C_1 R_3 + C_1 Z_L + C_3 R_3 Z_L g_m)}{C_1 C_3 R_1 R_3 Z_L g_m \sqrt{\frac{R_3 g_m}{C_1 C_3 R_1 R_3 Z_L g_m + C_1 C_3 R_3 Z_L}} + \frac{Z_L g_m}{C_1 C_3 R_1 R_3 Z_L g_m + C_1 C_3 R_3 Z_L} + C_1 C_3 R_3 Z_L \sqrt{\frac{R_3 g_m}{C_1 C_3 R_1 R_3 Z_L g_m + C_1 C_3 R_3 Z_L}} + \frac{Z_L g_m}{C_1 C_3 R_1 R_3 Z_L g_m + C_1 C_3 R_3 Z_L}}$$

$$\text{K-LP: } \frac{R_3 Z_L}{R_3 + Z_L}$$

K-HP: 0

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

Qz: None

Wz: None

9 INVALID-WZ

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

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

Parameters:

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

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

$$\text{bandwidth: } \frac{\sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_1 Z_L g_m + C_1 C_3 R_3 + C_1 C_3 Z_L}} (C_1 R_1 g_m + C_1 + C_3 R_3 g_m + C_3 Z_L g_m)}{C_1 C_3 R_1 R_3 g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_1 Z_L g_m + C_1 C_3 R_3 + C_1 C_3 Z_L}} + C_1 C_3 R_1 Z_L g_m \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_1 Z_L g_m + C_1 C_3 R_3 + C_1 C_3 Z_L}} + C_1 C_3 R_3 \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_1 Z_L g_m + C_1 C_3 R_3 + C_1 C_3 Z_L}} + C_1 C_3 Z_L \sqrt{\frac{g_m}{C_1 C_3 R_1 R_3 g_m + C_1 C_3 R_1 Z_L g_m + C_1 C_3 R_3 + C_1 C_3 Z_L}}}$$

K-LP: Z_L

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

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

Qz: None

$$\text{Wz: } \sqrt{\frac{1}{C_1 C_3 R_1 R_3}}$$

10 INVALID-ORDER

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

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

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

$$H(s) = \frac{R_1 Z_L g_m}{R_1 g_m + s(C_3 R_1 Z_L g_m + C_3 Z_L) + 1}$$

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

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

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

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

10.5 INVALID-ORDER-5 $Z(s) = (L_1 s, \infty, R_3, \infty, \infty)$

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

10.6 INVALID-ORDER-6 $Z(s) = \left(L_1 s, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty\right)$

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

10.7 INVALID-ORDER-7 $Z(s) = \left(L_1 s, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty\right)$

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

10.8 INVALID-ORDER-8 $Z(s) = \left(L_1 s, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty\right)$

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

10.9 INVALID-ORDER-9 $Z(s) = \left(L_1 s, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty\right)$

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

$$10.10 \quad \text{INVALID-ORDER-10} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$10.11 \quad \text{INVALID-ORDER-11} \quad Z(s) = \left(L_1 s, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

$$10.12 \quad \text{INVALID-ORDER-12} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad R_3, \quad \infty, \quad \infty \right)$$

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

$$10.13 \quad \text{INVALID-ORDER-13} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad L_3 s + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

$$10.14 \quad \text{INVALID-ORDER-14} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \frac{L_3 s}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$10.15 \quad \text{INVALID-ORDER-15} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad L_3 s + R_3 + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

$$10.16 \quad \text{INVALID-ORDER-16} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \quad \infty, \quad \infty \right)$$

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

$$10.17 \quad \text{INVALID-ORDER-17} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$10.18 \quad \text{INVALID-ORDER-18} \quad Z(s) = \left(\frac{1}{C_1 s}, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

10.19 INVALID-ORDER-19 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, R_3, \infty, \infty \right)$

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

10.20 INVALID-ORDER-20 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.21 INVALID-ORDER-21 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.22 INVALID-ORDER-22 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.23 INVALID-ORDER-23 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$

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

10.24 INVALID-ORDER-24 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.25 INVALID-ORDER-25 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.26 INVALID-ORDER-26 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty \right)$

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

10.27 INVALID-ORDER-27 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.28 INVALID-ORDER-28 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.29 INVALID-ORDER-29 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.30 INVALID-ORDER-30 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$

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

10.31 INVALID-ORDER-31 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.32 INVALID-ORDER-32 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.33 INVALID-ORDER-33 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.34 INVALID-ORDER-34 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.35 INVALID-ORDER-35 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.36 INVALID-ORDER-36 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.37 INVALID-ORDER-37 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.38 INVALID-ORDER-38 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.39 INVALID-ORDER-39 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$

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

10.40 INVALID-ORDER-40 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.41 INVALID-ORDER-41 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.42 INVALID-ORDER-42 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.43 INVALID-ORDER-43 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.44 INVALID-ORDER-44 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.45 INVALID-ORDER-45 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.46 INVALID-ORDER-46 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.47 INVALID-ORDER-47 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.48 INVALID-ORDER-48 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty \right)$

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

10.49 INVALID-ORDER-49 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.50 INVALID-ORDER-50 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.51 INVALID-ORDER-51 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.52 INVALID-ORDER-52 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty \right)$

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

10.53 INVALID-ORDER-53 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.54 INVALID-ORDER-54 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty \right)$

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

10.55 INVALID-ORDER-55 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty \right)$

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

10.56 INVALID-ORDER-56 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty \right)$

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

$$\mathbf{10.57 \quad INVALID-ORDER-57} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.58 \quad INVALID-ORDER-58} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.59 \quad INVALID-ORDER-59} \quad Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.60 \quad INVALID-ORDER-60} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.61 \quad INVALID-ORDER-61} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \frac{R_3}{C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.62 \quad INVALID-ORDER-62} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad R_3 + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

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

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

$$\mathbf{10.64 \quad INVALID-ORDER-64} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \frac{L_3 s}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

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

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

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

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

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

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

$$\mathbf{10.68 \quad INVALID-ORDER-68} \quad Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

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

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

$$\mathbf{10.70 \quad INVALID-ORDER-70} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \frac{R_3}{C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

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

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

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

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

$$\mathbf{10.73 \quad INVALID-ORDER-73} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \frac{L_3 s}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.74 \quad INVALID-ORDER-74} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad L_3 s + R_3 + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.75 \quad INVALID-ORDER-75} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.76 \quad INVALID-ORDER-76} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.77 \quad INVALID-ORDER-77} \quad Z(s) = \left(\frac{C_1 L_1 R_1 s^2 + L_1 s + R_1}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \frac{R_3 (C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

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

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

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

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

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

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

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

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

$$\mathbf{10.82 \quad INVALID-ORDER-82} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \frac{L_3 s}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.83 \quad INVALID-ORDER-83} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad L_3 s + R_3 + \frac{1}{C_3 s}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.84 \quad INVALID-ORDER-84} \quad Z(s) = \left(\frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.85 \quad INVALID-ORDER-85} \quad Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{C_3 L_3 s^2 + 1}, \quad \infty, \quad \infty \right)$$

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

$$\mathbf{10.86 \quad INVALID-ORDER-86} \quad Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \quad \infty, \quad \infty \right)$$

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

11 PolynomialError