Filter Summary Report: TIA,simple,Z1,Z3

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Contents

1 Examined $H(z)$ for TIA simple Z1 Z3: $\frac{Z_1Z_3g_m}{Z_1g_m+1}$	2
2 HP	2
3 BP 3.1 BP-1 $Z(s) = \left(R_1, \infty, \frac{L_3 R_{3s}}{C_3 L_3 R_{3s}^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$ 3.2 BP-2 $Z(s) = \left(L_1 s, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$ 3.3 BP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty\right)$	2 2
3.2 BP-2 $Z(s) = \left(L_1 s, \infty, \frac{R_3}{C_3 R_3 s+1}, \infty, \infty, \infty\right)$	2
3.3 BP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty\right)$	2
$3.4 \text{BP-4 } Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty\right) \dots $	3
f 4 LP	3
4.1 LP-1 $Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$	3
4.2 LP-2 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty, \infty\right)$	3
4.3 LP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$	4
4 LP 4.1 LP-1 $Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s+1}, \infty, \infty, \infty\right)$ 4.2 LP-2 $Z(s) = \left(\frac{R_1}{C_1 R_1 s+1}, \infty, \frac{R_3}{C_3 R_3 s+1}, \infty, \infty, \infty\right)$ 4.3 LP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$ 4.4 LP-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$	4
5 BS	4
5.1 BS-1 $Z(s) = \left(R_1, \infty, \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty, \infty\right)$	4
5.2 BS-2 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty, \infty\right)$	5
5.2 BS-2 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty, \infty\right)$ 5.3 BS-3 $Z(s) = \left(\frac{R_1(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \infty, R_3, \infty, \infty\right)$	5
6 GE 6.1 GE-1 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty, \infty\right)$ 6.2 GE-2 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, R_3, \infty, \infty, \infty\right)$	5 5
$6.2 \text{GE-2 } Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty\right) \dots $	6
7 AP	6
8 INVALID-NUMER $8.1 \text{INVALID-NUMER-1} \ Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) $ $8.2 \text{INVALID-NUMER-2} \ Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$	6
8.2 INVALID-NUMER-2 $Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty, \infty\right)$	6
8.3 INVALID-NUMER-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$	7
9 INVALID-WZ	7
9.1 INVALID-WZ-1 $Z(s) = \left(\frac{L_1s}{C_1L_1s^2+1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty, \infty\right)$	7
9.2 INVALID-WZ-2 $Z(s) = \left(\frac{L_{1s}}{C_{1}L_{1}s^{2}+1}, \infty, L_{3}s + R_{3} + \frac{1}{C_{3}s}, \infty, \infty, \infty\right)$ 9.3 INVALID-WZ-3 $Z(s) = \left(\frac{L_{1}R_{1}s}{C_{1}L_{1}R_{1}s^{2}+L_{1}s+R_{1}}, \infty, L_{3}s + \frac{1}{C_{3}s}, \infty, \infty, \infty\right)$	7
9.3 INVALID-WZ-3 $Z(s) = \left(\frac{L_1R_1s}{C_1L_1R_1s^2 + L_1s + R_1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty, \infty\right)$	8
9.4 INVALID-WZ-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$	8

0 INVALID-ORDER
10.1 INVALID-ORDER-1 $Z(s) = (R_1, \infty, R_3, \infty, \infty, \infty)$
10.3 INVALID-ORDER-3 $Z(s) = \left(R_1, \infty, \frac{R_3}{C_2R_2s+1}, \infty, \infty, \infty\right)$
10.4 INVALID-ORDER-4 $Z(s) = \left(R_1, \infty, R_3 + \frac{1}{C_2 s}, \infty, \infty, \infty\right)$
10.5 INVALID-ORDER-5 $Z(s) = \left(R_1, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty, \infty\right)$
10.6 INVALID-ORDER-6 $Z(s) = \left(R_1, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty, \infty\right)'$
10.7 INVALID-ORDER-7 $Z(s) = \left(R_1, \infty, L_3s + R_3 + \frac{1}{C_3s}, \infty, \infty, \infty, \infty\right)$
10.8 INVALID-ORDER-8 $Z(s) = \left(R_1, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, \infty\right)$
10.9 INVALID-ORDER-9 $Z(s) = (L_1 s, \infty, R_3, \infty, \infty, \infty)$
10.10INVALID-ORDER-10 $Z(s) = \left(L_1 s, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$
10.11INVALID-ORDER-12 $Z(s) = \left(L_1 s, \infty, L_3 s + \frac{1}{C_2 s}, \infty, \infty, \infty\right)$
$10.13 \text{INVALID-ORDER-} 13 \ Z(s) = \left(L_1 s, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right) $
10.14INVALID-ORDER-14 $Z(s) = \left(L_1 s, \infty, L_3 s + R_3 + \frac{1}{C_2 s}, \infty, \infty\right)$
$10.15 \text{INVALID-ORDER-15 } 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, \infty\right) $
$10.16 \text{INVALID-ORDER-} 16 \ Z(s) = \left(L_1 s, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \ \infty, \ \infty, \ \infty\right) \qquad \dots \qquad 1$
$10.17 \text{INVALID-ORDER-17 } Z(s) = \left(L_1 s, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right) $
$10.18 \text{INVALID-ORDER-} 18 \ Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty\right) \qquad . \qquad $
10.19INVALID-ORDER-19 $Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$
$10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_2 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad 10.20 \text{INVALID-ORDER-20 } Z(s) = \left(\frac{1}{C_1 s}, \infty\right) \qquad$
$10.21 \text{INVALID-ORDER-} 21 \ Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty\right) \dots \qquad 1$
$10.22 \text{INVALID-ORDER-} 22 \ Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_2 s^2 + 1}, \ \infty, \ \infty, \ \infty\right) \qquad . \qquad $
$10.23 \text{INVALID-ORDER-} 23 \ Z(s) = \left(\frac{1}{C_{1:s}}, \ \infty, \ L_{3}s + R_{3} + \frac{1}{C_{2:s}}, \ \infty, \ \infty\right) \ \dots $
$10.24 \text{INVALID-ORDER-} 24 \ Z(s) = \left(\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, \ \infty\right) $
$10.25 \text{INVALID-ORDER-} 25 \ Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \ \infty, \ \infty, \ \infty\right) $
$10.26 \text{INVALID-ORDER-} 26 \ Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) $
$10.27 \text{INVALID-ORDER-27 } Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ R_3, \ \infty, \ \infty\right) \qquad . \qquad $
$10.28 \text{INVALID-ORDER-} 28 \ Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{1}{C_2 s}, \ \infty, \ \infty\right) \dots \qquad 1$
$10.29 \text{INVALID-ORDER-} 29 \ Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ R_3 + \frac{1}{C_2 s}, \ \infty, \ \infty, \ \infty\right) \ \dots $
$10.30 \text{INVALID-ORDER-30 } Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty\right) $
$10.31 \text{INVALID-ORDER-31 } Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)'$
$10.32 \text{INVALID-ORDER-} 32 \ 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) \dots $
$10.33 \text{INVALID-ORDER-} 33 \ 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, \ \infty\right) \dots $
$10.34 \text{INVALID-ORDER-34} \ Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \ \infty, \ \infty, \ \infty\right) \left(\frac{R_3 s}{C_3 L_3 s^2 + 1} + R_3, \ \infty, \ \infty\right)$
10.35INVALID-ORDER-35 $Z(s) = \left(\frac{R_1}{C_1R_1s+1}, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty, \infty\right)$
$10.36 \text{INVALID-ORDER-36 } Z(s) = \left(R_1 + \frac{1}{C_s}, \infty, R_3, \infty, \infty, \infty\right) \dots $
10.37INVALID-ORDER-37 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$
$10.38 \text{INVALID-ORDER-38 } Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right) \qquad . \qquad 10.38 \text{INVALID-ORDER-38 } Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$
10.39INVALID-ORDER-39 $Z(s) = (R_1 + \frac{1}{C_1 s}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty)$
$10.40 \text{INVALID-ORDER-40 } Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)' $

$10.41 \text{INVALID-ORDER-41 } Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) $
$10.42 \text{INVALID-ORDER-} 42 \ 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, \ \infty\right) \ \dots $
$10.43 \text{INVALID-ORDER-43 } Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$
10.44INVALID-ORDER-44 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$
$10.45 \text{INVALID-ORDER-} 45 \ Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) \ \dots $
$10.46 \text{INVALID-ORDER-} 46 \ Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) $
$10.47 \text{INVALID-ORDER-47 } Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right) \dots \dots$
$10.48 \text{INVALID-ORDER-} 48 \ Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) \dots $
$10.49 \text{INVALID-ORDER-49 } Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)$
$10.50 \text{INVALID-ORDER-50 } Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) $
$10.51\text{INVALID-ORDER-51 } 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, \infty\right) $
10.52INVALID-ORDER-52 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$
10.53INVALID-ORDER-53 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$
$10.54 \text{INVALID-ORDER-} 54 \ 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) $
$10.55 \text{INVALID-ORDER-} 55 \ Z(s) = \left(\frac{L_{18}}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{L_{38}}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right) $
$10.56 \text{INVALID-ORDER-} 56 \ 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, \ \infty\right) \ \dots $
$10.57 \text{INVALID-ORDER-57 } Z(s) = \left(\frac{L_{1s}}{C_1 L_1 s^2 + 1}, \infty, \frac{L_{3s}}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$
10.58INVALID-ORDER-58 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$
$10.59 \text{INVALID-ORDER-59 } Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right) $
$10.60 \text{INVALID-ORDER-} 60 \ 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, \ \infty\right) \dots $
$10.61 \text{INVALID-ORDER-61 } Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right) $
$10.62 \text{INVALID-ORDER-} 62 \ Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) \dots $
$10.63 \text{INVALID-ORDER-} 63 \ 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, \ \infty\right) $
$10.64 \text{INVALID-ORDER-} 64 \ 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, \ \infty\right) \dots $
$10.65 \text{INVALID-ORDER-} 65 \ Z(s) = \left(L_1 s + 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, \ \infty\right) $ $10.66 \text{INVALID-ORDER-} 66 \ Z(s) = \left(L_1 s + 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, \ \infty\right) $ 15 $10.66 \text{INVALID-ORDER-} 66 \ 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} + R_3, \ \infty, \ \infty, \ \infty\right) $ 15
10.66INVALID-ORDER-66 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$ 15
10.67INVALID-ORDER-67 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$
$10.68 \text{INVALID-ORDER-} 68 \ Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) $
10.69INVALID-ORDER-69 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)$
$10.70 \text{INVALID-ORDER-} 70 \ Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty\right) $
10.71INVALID-ORDER-71 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$ 10.71INVALID-ORDER-71 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$
$10.72INVALID-ORDER-72 \ Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) \ \dots $
$10.73 \text{INVALID-ORDER-} 73 \ Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) $
$10.74 \text{INVALID-ORDER-} 74 \ Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right) \ \dots $
$10.75 \text{INVALID-ORDER-} 75 \ Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) \dots $
$10.76 \text{INVALID-ORDER-} 76 \ Z(s) = \left(\frac{L_{18}}{C_{1}L_{1}s^{2}+1} + R_{1}, \ \infty, \ L_{3}s + \frac{1}{C_{2}s}, \ \infty, \ \infty, \ \infty\right) \ \dots $
10.77INVALID-ORDER-77 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1}, \ \infty, \ \infty, \ \infty\right)'$
$10.78 \text{INVALID-ORDER-} 78 \ Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ L_3 s + R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right) $
10.79INVALID-ORDER-79 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \ \infty, \ \infty, \ \infty\right)$

10.80INVALID-ORDER-80 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \ \infty, \ \infty, \ \infty\right)$. 17
10.81INVALID-ORDER-81 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \ \infty, \ \infty, \ \infty\right)$. 17
$10.82 \text{INVALID-ORDER-82 } Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right) $. 17
$10.83 \text{INVALID-ORDER-83 } Z(s) = \left\langle \frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{R_3}{C_3R_3s+1}, \ \infty, \ \infty, \ \infty \right\rangle \ \dots $. 17
10.84INVALID-ORDER-84 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, R_3 + \frac{1}{C_3s}, \infty, \infty, \infty\right)$. 17
10.85INVALID-ORDER-85 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, L_3s + \frac{1}{C_3s}, \infty, \infty, \infty\right)$	
$10.86 \text{INVALID-ORDER-86} \ Z(s) = \left\langle \frac{R_1 \left(C_1 L_1 s^2 + 1 \right)}{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, \ \infty \right\rangle' $. 17
$10.87 \text{INVALID-ORDER-87 } Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ L_3s+R_3+\frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right)$. 17
10.88INVALID-ORDER-88 $Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \infty, \infty, \infty, \infty\right)$. 18
10.89INVALID-ORDER-89 $Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{L_{3s}}{C_3L_3s^2+1} + R_3, \ \infty, \ \infty, \ \infty\right)$. 18
$10.90 \text{INVALID-ORDER-90 } Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1}, \ \infty, \ \infty, \ \infty\right) $. 18

- 1 Examined H(z) for TIA simple Z1 Z3: $\frac{Z_1Z_3g_m}{Z_1g_m+1}$
- 2 HP
- 3 BP
- **3.1** BP-1 $Z(s) = \left(R_1, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$

Q:
$$C_3R_3\sqrt{\frac{1}{C_3L_3}}$$

wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{1}{C_3R_3}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_1R_3g_m}{R_1g_m+1}$
Qz: 0
Wz: None

3.2 BP-2 $Z(s) = \left(L_1 s, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$

Parameters:

Q:
$$\frac{C_3L_1R_3g_m\sqrt{\frac{1}{C_3L_1R_3g_m}}}{C_3R_3+L_1g_m}$$
 wo:
$$\sqrt{\frac{1}{C_3L_1R_3g_m}}$$
 bandwidth:
$$\frac{C_3R_3+L_1g_m}{C_3L_1R_3g_m}$$
 K-LP: 0
K-HP: 0
K-BP:
$$\frac{L_1R_3g_m}{C_3R_3+L_1g_m}$$
 Qz: 0
Wz: None

3.3 BP-3 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, R_3, \infty, \infty, \infty\right)$

Q:
$$\frac{C_1\sqrt{\frac{1}{C_1L_1}}}{g_m}$$
 wo: $\sqrt{\frac{1}{C_1L_1}}$ bandwidth: $\frac{g_m}{C_1}$ K-LP: 0 K-HP: 0 K-BP: R_3 Qz: 0

$$H(z) = \frac{Z_1 Z_3 g_m}{Z_1 g_m + 1}$$

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

$$H(s) = \frac{L_1 R_3 g_m s}{\left(C_3 R_3 s + 1\right) \left(L_1 g_m s + 1\right)}$$

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

Wz: None

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

Parameters:

Q: $\frac{C_1R_1\sqrt{\frac{1}{C_1L_1}}}{R_1g_m+1}$ wo: $\sqrt{\frac{1}{C_1L_1}}$ bandwidth: $\frac{R_1g_m+1}{C_1R_1}$ K-LP: 0 K-HP: 0 K-BP: $\frac{R_1R_3g_m}{R_1g_m+1}$ Qz: 0 Wz: None

4 LP

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

Parameters:

Q: $\frac{C_1C_3R_3\sqrt{\frac{g_m}{C_1C_3R_3}}}{C_1+C_3R_3g_m}$ wo: $\sqrt{\frac{g_m}{C_1C_3R_3}}$ bandwidth: $\frac{C_1+C_3R_3g_m}{C_1C_3R_3}$ K-LP: R_3 K-HP: 0 K-BP: 0 Qz: None Wz: None

4.2 LP-2 $Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$

Parameters:

 $\begin{array}{l} \text{Q:} \ \frac{C_1C_3R_1R_3\sqrt{\frac{R_1g_m+1}{C_1C_3R_1R_3}}}{C_1R_1+C_3R_1R_3g_m+C_3R_3} \\ \text{wo:} \ \sqrt{\frac{R_1g_m+1}{C_1C_3R_1R_3}} \\ \text{bandwidth:} \ \frac{C_1R_1+C_3R_1R_3g_m+C_3R_3}{C_1C_3R_1R_3} \\ \text{K-LP:} \ \frac{R_1R_3g_m}{R_1g_m+1} \\ \text{K-HP:} \ 0 \\ \text{K-BP:} \ 0 \\ \text{Qz:} \ \text{None} \\ \text{Wz:} \ \text{None} \end{array}$

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

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

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

4.3 LP-3
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

Q:
$$\frac{C_1\sqrt{\frac{1}{C_1L_1}}}{g_m}$$
 wo:
$$\sqrt{\frac{1}{C_1L_1}}$$
 bandwidth:
$$\frac{g_m}{C_1}$$
 K-LP:
$$\frac{L_1g_m}{C_3}$$
 K-HP: 0 K-BP: 0 Qz: None Wz: None

4.4 LP-4
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

Parameters:

Q:
$$\frac{C_1R_1\sqrt{\frac{1}{C_1L_1}}}{R_1g_m+1}$$
 wo:
$$\sqrt{\frac{1}{C_1L_1}}$$
 bandwidth:
$$\frac{R_1g_m+1}{C_1R_1}$$
 K-LP:
$$\frac{L_1g_m}{C_3}$$
 K-HP: 0 K-BP: 0 Qz: None Wz: None

5 BS

5.1 BS-1
$$Z(s) = \left(R_1, \infty, \frac{R_3(C_3L_3s^2+1)}{C_3L_3s^2+C_3R_3s+1}, \infty, \infty, \infty\right)$$

$$\begin{array}{l} \text{Q:} \ \frac{L_3\sqrt{\frac{1}{C_3L_3}}}{R_3} \\ \text{wo:} \ \sqrt{\frac{1}{C_3L_3}} \\ \text{bandwidth:} \ \frac{R_3}{R_3} \\ \text{K-LP:} \ \frac{R_1R_3g_m}{R_1g_m+1} \\ \text{K-HP:} \ \frac{R_1R_3g_m}{R_1g_m+1} \\ \text{K-BP:} \ 0 \\ \text{Qz:} \ \text{None} \\ \text{Wz:} \ \sqrt{\frac{1}{C_3L_3}} \end{array}$$

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

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

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

5.2 BS-2
$$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ R_3, \ \infty, \ \infty, \ \infty\right)$$

Q:
$$L_1g_m\sqrt{\frac{1}{C_1L_1}}$$

wo: $\sqrt{\frac{1}{C_1L_1}}$
bandwidth: $\frac{1}{L_1g_m}$
K-LP: R_3
K-HP: R_3
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_1L_1}}$

5.3 BS-3
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, R_3, \infty, \infty, \infty\right)$$

Parameters:

$$\begin{array}{l} \text{Q:} \ \frac{L_1\sqrt{\frac{1}{C_1L_1}}(R_1g_m+1)}{R_1} \\ \text{wo:} \ \sqrt{\frac{1}{C_1L_1}} \\ \text{bandwidth:} \ \frac{R_1}{L_1(R_1g_m+1)} \\ \text{K-LP:} \ \frac{R_1R_3g_m}{R_1g_m+1} \\ \text{K-HP:} \ \frac{R_1R_3g_m}{R_1g_m+1} \\ \text{K-BP:} \ 0 \\ \text{Qz:} \ \text{None} \\ \text{Wz:} \ \sqrt{\frac{1}{C_1L_1}} \end{array}$$

6 **GE**

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

$$\begin{array}{l} \text{Q:} \ \frac{L_{1}g_{m}\sqrt{\frac{1}{C_{1}L_{1}}}}{R_{1}g_{m}+1} \\ \text{wo:} \ \sqrt{\frac{1}{C_{1}L_{1}}} \\ \text{bandwidth:} \ \frac{R_{1}g_{m}+1}{L_{1}g_{m}} \\ \text{K-LP:} \ R_{3} \\ \text{K-HP:} \ R_{3} \\ \text{K-BP:} \ \frac{R_{1}R_{3}g_{m}}{R_{1}g_{m}+1} \\ \text{Qz:} \ \frac{L_{1}\sqrt{\frac{1}{C_{1}L_{1}}}}{R_{1}} \\ \text{Wz:} \ \sqrt{\frac{1}{C_{1}L_{1}}} \end{array}$$

$$H(s) = \frac{R_3 g_m \left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 g_m s^2 + C_1 s + g_m}$$

$$H(s) = \frac{R_1 R_3 g_m \left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m + 1}$$

$$H(s) = \frac{R_3 g_m \left(C_1 L_1 s^2 + C_1 R_1 s + 1 \right)}{C_1 L_1 g_m s^2 + C_1 R_1 g_m s + C_1 s + g_m}$$

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

 $H(s) = \frac{R_3 g_m \left(C_1 L_1 R_1 s^2 + L_1 s + R_1 \right)}{C_1 L_1 R_1 g_m s^2 + C_1 L_1 s^2 + L_1 g_m s + R_1 g_m + 1}$

Parameters:

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

7 AP

8 INVALID-NUMER

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

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

Parameters:

$$\begin{array}{l} \text{Q:} \ \frac{C_1C_3R_3\sqrt{\frac{g_m}{C_1C_3R_3(R_1g_m+1)}}(R_1g_m+1)}{C_1R_1g_m+C_1+C_3R_3g_m}\\ \text{wo:} \ \sqrt{\frac{g_m}{C_1C_3R_3(R_1g_m+1)}}\\ \text{bandwidth:} \ \frac{C_1R_1g_m+C_1+C_3R_3g_m}{C_1C_3R_3(R_1g_m+1)}\\ \text{K-LP:} \ R_3\\ \text{K-HP:} \ 0\\ \text{K-BP:} \ \frac{C_1R_1R_3g_m}{C_1R_1g_m+C_1+C_3R_3g_m}\\ \text{Qz:} \ 0\\ \text{Wz:} \ \text{None} \end{array}$$

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

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

Q:
$$\frac{C_1\sqrt{\frac{1}{C_1L_1}}}{g_m}$$
 wo:
$$\sqrt{\frac{1}{C_1L_1}}$$
 bandwidth:
$$\frac{g_m}{C_1}$$
 K-LP:
$$\frac{L_1g_m}{C_3}$$
 K-HP: 0
K-BP: R_3 Qz: 0
Wz: None

8.3 INVALID-NUMER-3
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

Q:
$$\frac{C_1R_1\sqrt{\frac{1}{C_1L_1}}}{R_1g_m+1}$$

wo: $\sqrt{\frac{1}{C_1L_1}}$
bandwidth: $\frac{R_1g_m+1}{C_1R_1}$
K-LP: $\frac{L_1g_m}{C_3}$
K-HP: 0
K-BP: $\frac{R_1R_3g_m}{R_1g_m+1}$
Qz: 0
Wz: None

9 INVALID-WZ

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

$$H(s) = \frac{L_1 g_m \left(C_3 L_3 s^2 + 1 \right)}{C_3 \left(C_1 L_1 s^2 + L_1 g_m s + 1 \right)}$$

Parameters:

$$\begin{array}{l} \text{Q:} \ \frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m} \\ \text{wo:} \ \sqrt{\frac{1}{C_1 L_1}} \\ \text{bandwidth:} \ \frac{g_m}{C_1} \\ \text{K-LP:} \ \frac{L_1 g_m}{C_3} \\ \text{K-HP:} \ \frac{L_3 g_m}{C_1} \\ \text{K-BP:} \ 0 \\ \text{Qz:} \ \text{None} \\ \text{Wz:} \ \sqrt{\frac{1}{C_3 L_3}} \end{array}$$

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

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

$$\begin{aligned} &\text{Q: } \frac{C_1 \sqrt{\frac{1}{C_1 L_1}}}{g_m} \\ &\text{wo: } \sqrt{\frac{1}{C_1 L_1}} \\ &\text{bandwidth: } \frac{g_m}{C_1} \\ &\text{K-LP: } \frac{L_1 g_m}{C_3} \\ &\text{K-HP: } \frac{L_3 g_m}{C_1} \\ &\text{K-BP: } R_3 \\ &\text{Qz: } \frac{L_3 \sqrt{\frac{1}{C_1 L_1}}}{R_3} \\ &\text{Wz: } \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

9.3 INVALID-WZ-3 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$

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

Parameters:

$$\begin{array}{l} \text{Q:} \ \frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\ \text{wo:} \ \sqrt{\frac{1}{C_1 L_1}} \\ \text{bandwidth:} \ \frac{R_1 g_m + 1}{C_1 R_1} \\ \text{K-LP:} \ \frac{L_1 g_m}{C_3} \\ \text{K-HP:} \ \frac{L_3 g_m}{C_1} \\ \text{K-BP:} \ 0 \\ \text{Qz:} \ \text{None} \\ \text{Wz:} \ \sqrt{\frac{1}{C_3 L_3}} \end{array}$$

9.4 INVALID-WZ-4 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$

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

Parameters:

$$\begin{aligned} &\text{Q: } \frac{C_1 R_1 \sqrt{\frac{1}{C_1 L_1}}}{R_1 g_m + 1} \\ &\text{wo: } \sqrt{\frac{1}{C_1 L_1}} \\ &\text{bandwidth: } \frac{R_1 g_m + 1}{C_1 R_1} \\ &\text{K-LP: } \frac{L_1 g_m}{C_3} \\ &\text{K-HP: } \frac{L_3 g_m}{C_1} \\ &\text{K-BP: } \frac{R_1 R_3 g_m}{R_1 g_m + 1} \\ &\text{Qz: } \frac{L_3 \sqrt{\frac{1}{C_1 L_1}}}{R_3} \\ &\text{Wz: } \sqrt{\frac{1}{C_3 L_3}} \end{aligned}$$

10 INVALID-ORDER

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

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

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

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

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

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

11

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

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

10.5 INVALID-ORDER-5
$$Z(s) = \left(R_1, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.6 INVALID-ORDER-6
$$Z(s) = \left(R_1, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty, \infty\right)$$

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

10.7 INVALID-ORDER-7
$$Z(s) = \left(R_1, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.8 INVALID-ORDER-8
$$Z(s) = \left(R_1, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, \infty\right)$$

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

10.9 INVALID-ORDER-9
$$Z(s) = (L_1 s, \infty, R_3, \infty, \infty, \infty)$$

$$H(s) = \frac{L_1 R_3 g_m s}{L_1 g_m s + 1}$$

10.10 INVALID-ORDER-10
$$Z(s) = \left(L_1 s, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

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

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

10.12 INVALID-ORDER-12
$$Z(s) = \left(L_1 s, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{L_1 g_m \left(C_3 L_3 s^2 + 1 \right)}{C_3 \left(L_1 q_m s + 1 \right)}$$

10.13 INVALID-ORDER-13
$$Z(s) = \left(L_1 s, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)$$

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

10.14 INVALID-ORDER-14
$$Z(s) = \left(L_1 s, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.15 INVALID-ORDER-15
$$Z(s) = \left(L_1 s, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

10.16 INVALID-ORDER-16
$$Z(s) = \left(L_1 s, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.17 INVALID-ORDER-17
$$Z(s) = \left(L_1 s, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

10.18 INVALID-ORDER-18
$$Z(s) = \left(\frac{1}{C_1 s}, \infty, R_3, \infty, \infty, \infty\right)$$

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

10.19 INVALID-ORDER-19
$$Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{g_m}{C_3 s \left(C_1 s + g_m\right)}$$

10.20 INVALID-ORDER-20
$$Z(s) = \left(\frac{1}{C_1 s}, \infty, R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{g_m (C_3 R_3 s + 1)}{C_3 s (C_1 s + q_m)}$$

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

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

10.22 INVALID-ORDER-22
$$Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)$$

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

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

$$H(s) = \frac{g_m \left(C_3 L_3 s^2 + C_3 R_3 s + 1 \right)}{C_3 s \left(C_1 s + g_m \right)}$$

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

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

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

$$H(s) = \frac{g_m \left(C_3 L_3 R_3 s^2 + L_3 s + R_3 \right)}{\left(C_1 s + q_m \right) \left(C_3 L_3 s^2 + 1 \right)}$$

10.26 INVALID-ORDER-26
$$Z(s) = \left(\frac{1}{C_1 s}, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{R_3 g_m \left(C_3 L_3 s^2 + 1\right)}{\left(C_1 s + g_m\right) \left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)}$$

10.27 INVALID-ORDER-27
$$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, R_3, \infty, \infty, \infty\right)$$

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

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

$$H(s) = \frac{R_1 g_m}{C_3 s \left(C_1 R_1 s + R_1 g_m + 1 \right)}$$

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

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

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

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

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

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

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

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

10.33 INVALID-ORDER-33
$$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

10.34 INVALID-ORDER-34
$$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.35 INVALID-ORDER-35
$$Z(s) = \left(\frac{R_1}{C_1 R_1 s + 1}, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

10.36 INVALID-ORDER-36
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, R_3, \infty, \infty, \infty\right)$$

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

10.37 INVALID-ORDER-37
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.38 INVALID-ORDER-38
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ R_3 + \frac{1}{C_3 s}, \ \infty, \ \infty, \ \infty\right)$$

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

10.39 INVALID-ORDER-39
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ L_3 s + \frac{1}{C_3 s}, \ \infty, \ \infty\right)$$

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

10.40 INVALID-ORDER-40
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_{3s}}{C_3 L_3 s^2 + 1}, \infty, \infty, \infty\right)$$

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

10.41 INVALID-ORDER-41
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.42 INVALID-ORDER-42
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{L_{3}R_{3}g_{m}s\left(C_{1}R_{1}s+1\right)}{\left(C_{1}R_{1}g_{m}s+C_{1}s+g_{m}\right)\left(C_{3}L_{3}R_{3}s^{2}+L_{3}s+R_{3}\right)}$$

10.43 INVALID-ORDER-43
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.44 INVALID-ORDER-44
$$Z(s) = \left(R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3(C_3 L_3 s^2 + 1)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

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

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

10.46 INVALID-ORDER-46
$$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

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

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

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

$$H(s) = \frac{g_m \left(C_1 L_1 s^2 + 1 \right) \left(C_3 L_3 s^2 + 1 \right)}{C_3 s \left(C_1 L_1 g_m s^2 + C_1 s + g_m \right)}$$

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

$$H(s) = \frac{L_3 g_m s \left(C_1 L_1 s^2 + 1\right)}{\left(C_3 L_3 s^2 + 1\right) \left(C_1 L_1 g_m s^2 + C_1 s + g_m\right)}$$

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

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

10.51 INVALID-ORDER-51
$$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

10.52 INVALID-ORDER-52
$$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.53 INVALID-ORDER-53
$$Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

10.54 INVALID-ORDER-54
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \frac{R_3}{C_3 R_3 s + 1}, \ \infty, \ \infty\right)$$

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

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

$$H(s) = \frac{L_1 L_3 g_m s^2}{\left(C_3 L_3 s^2 + 1\right) \left(C_1 L_1 s^2 + L_1 g_m s + 1\right)}$$

10.56 INVALID-ORDER-56
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

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

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

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

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

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

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

10.60 INVALID-ORDER-60
$$Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{R_3}{C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

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

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

10.62 INVALID-ORDER-62
$$Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, L_3 s + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

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

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

10.64 INVALID-ORDER-64
$$Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

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

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

10.66 INVALID-ORDER-66
$$Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

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

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

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

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

10.69 INVALID-ORDER-69
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1}, \infty, \infty\right)$$

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

10.70 INVALID-ORDER-70
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

10.71 INVALID-ORDER-71
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.72 INVALID-ORDER-72
$$Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty\right)$$

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

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

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

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

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

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

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

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

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

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

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

10.78 INVALID-ORDER-78
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, L_3 s + R_3 + \frac{1}{C_3 s}, \infty, \infty, \infty\right)$$

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

10.79 INVALID-ORDER-79
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2 + L_3 s + R_3}, \infty, \infty, \infty\right)$$

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

10.80 INVALID-ORDER-80
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3, \infty, \infty, \infty\right)$$

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

10.81 INVALID-ORDER-81
$$Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \infty, \frac{R_3 \left(C_3 L_3 s^2 + 1\right)}{C_3 L_3 s^2 + C_3 R_3 s + 1}, \infty, \infty, \infty\right)$$

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

10.82 INVALID-ORDER-82
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right)$$

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

10.83 INVALID-ORDER-83
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \frac{R_3}{C_3R_3s+1}, \infty, \infty, \infty\right)$$

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

10.84 INVALID-ORDER-84
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ R_3 + \frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right)$$

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

10.85 INVALID-ORDER-85
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ L_3s + \frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right)$$

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

10.86 INVALID-ORDER-86
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \infty, \frac{L_3s}{C_3L_3s^2+1}, \infty, \infty, \infty\right)$$

$$H(s) = \frac{L_3 R_1 g_m s \left(C_1 L_1 s^2 + 1\right)}{\left(C_3 L_3 s^2 + 1\right) \left(C_1 L_1 R_1 q_m s^2 + C_1 L_1 s^2 + C_1 R_1 s + R_1 q_m + 1\right)}$$

10.87 INVALID-ORDER-87
$$Z(s) = \left(\frac{R_1(C_1L_1s^2+1)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ L_3s + R_3 + \frac{1}{C_3s}, \ \infty, \ \infty, \ \infty\right)$$

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

10.88 INVALID-ORDER-88
$$Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3}, \ \infty, \ \infty, \ \infty\right)$$

$$H(s) = \frac{L_3R_1R_3g_ms\left(C_1L_1s^2+1\right)}{\left(C_3L_3R_3s^2+L_3s+R_3\right)\left(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1\right)}$$

10.89 INVALID-ORDER-89
$$Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \infty, \frac{L_3s}{C_3L_3s^2+1} + R_3, \infty, \infty, \infty\right)$$

$$H(s) = \frac{R_1g_m\left(C_1L_1s^2+1\right)\left(C_3L_3R_3s^2+L_3s+R_3\right)}{\left(C_3L_3s^2+1\right)\left(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1\right)}$$

10.90 INVALID-ORDER-90
$$Z(s) = \left(\frac{R_1\left(C_1L_1s^2+1\right)}{C_1L_1s^2+C_1R_1s+1}, \ \infty, \ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1}, \ \infty, \ \infty, \ \infty\right)$$

$$H(s) = \frac{R_1R_3g_m\left(C_1L_1s^2+1\right)\left(C_3L_3s^2+1\right)}{\left(C_3L_3s^2+C_3R_3s+1\right)\left(C_1L_1R_1g_ms^2+C_1L_1s^2+C_1R_1s+R_1g_m+1\right)}$$

11 PolynomialError