Filter Summary Report: TIA,some,parasitic,Z3,ZL

Generated by MacAnalog-Symbolix

December 5, 2024

Contents

1 Examined $H(z)$ for TIA some parasitic Z3 ZL: $\frac{Z_3 Z_L (g_m r_o+1)}{Z_3 g_m r_o+Z_3+Z_L g_m r_o+Z_L}$ **5**

2 HP **5**

3 BP **5**

3.1 BP-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$ . . . 5

3.2 BP-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ . . . 5

3.3 BP-3 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ . . . 5

3.4 BP-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$ . . . 6

3.5 BP-5 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ . . . 6

3.6 BP-6 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ R_L\right)$ . . . 6

3.7 BP-7 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$ . . . 7

3.8 BP-8 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ . . . 7

3.9 BP-9 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L\right)$ . . . 7

3.10 BP-10 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ . . . 8

3.11 BP-11 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$ . . . 8

3.12 BP-12 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$ . . . 8

3.13 BP-13 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ . . . 9

4 LP **9**

5 BS **9**

5.1 BS-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$ . . . 9

5.2 BS-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$ . . . 9

5.3 BS-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$ . . . 10

5.4 BS-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L\right)$ . . . 10

6 GE **10**

6.1 GE-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$ . . . 10

6.2 GE-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$ . . . 11

6.3 GE-3 $Z(s)=\left(\infty,\ \infty,\ L_3s+R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$ . . . 11
6.4 GE-4 $Z(s)=\left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1}+R_3,\ \infty,\ \infty,\ R_L\right)$ . . . 11

7 AP **12**

8 INVALID-NUMER **12**
8.1 INVALID-NUMER-1 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$ . . . 12
8.2 INVALID-NUMER-2 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$ . . . 12

9 INVALID-WZ **12**

10 INVALID-ORDER **13**
10.1 INVALID-ORDER-1 $Z(s)=(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L)$ . . . 13
10.2 INVALID-ORDER-2 $Z(s)=\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$ . . . 13
10.3 INVALID-ORDER-3 $Z(s)=\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$ . . . 13
10.4 INVALID-ORDER-4 $Z(s)=\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$ . . . 13
10.5 INVALID-ORDER-5 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$ . . . 13
10.6 INVALID-ORDER-6 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$ . . . 13
10.7 INVALID-ORDER-7 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$ . . . 13
10.8 INVALID-ORDER-8 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$ . . . 13
10.9 INVALID-ORDER-9 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$ . . . 14
10.10INVALID-ORDER-10 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$ . . . 14
10.11INVALID-ORDER-11 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$ . . . 14
10.12INVALID-ORDER-12 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$ . . . 14
10.13INVALID-ORDER-13 $Z(s)=\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L\left(L_Ls+\frac{1}{C_Ls}\right)}{L_Ls+R_L+\frac{1}{C_Ls}}\right)$ . . . 14
10.14INVALID-ORDER-14 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ R_L\right)$ . . . 14
10.15INVALID-ORDER-15 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$ . . . 14
10.16INVALID-ORDER-16 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$ . . . 14
10.17INVALID-ORDER-17 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$ . . . 14
10.18INVALID-ORDER-18 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$ . . . 15
10.19INVALID-ORDER-19 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$ . . . 15
10.20INVALID-ORDER-20 $Z(s)=\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L\left(L_Ls+\frac{1}{C_Ls}\right)}{L_Ls+R_L+\frac{1}{C_Ls}}\right)$ . . . 15
10.21INVALID-ORDER-21 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$ . . . 15
10.22INVALID-ORDER-22 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$ . . . 15
10.23INVALID-ORDER-23 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$ . . . 15
10.24INVALID-ORDER-24 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$ . . . 15
10.25INVALID-ORDER-25 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$ . . . 15
10.26INVALID-ORDER-26 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$ . . . 15
10.27INVALID-ORDER-27 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls+\frac{1}{R_L}+\frac{1}{L_Ls}}\right)$ . . . 16
10.28INVALID-ORDER-28 $Z(s)=\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$ . . . 16

10.29INVALID-ORDER-29 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$ . . . 16
10.30INVALID-ORDER-30 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ . . . 16
10.31INVALID-ORDER-31 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$ . . . 16
10.32INVALID-ORDER-32 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ . . . 16
10.33INVALID-ORDER-33 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ . . . 16
10.34INVALID-ORDER-34 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$ . . . 16
10.35INVALID-ORDER-35 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ . . . 17
10.36INVALID-ORDER-36 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$ . . . 17
10.37INVALID-ORDER-37 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$ . . . 17
10.38INVALID-ORDER-38 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$ . . . 17
10.39INVALID-ORDER-39 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ . . . 17
10.40INVALID-ORDER-40 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ . . . 17
10.41INVALID-ORDER-41 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ . . . 17
10.42INVALID-ORDER-42 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$ . . . 17
10.43INVALID-ORDER-43 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ . . . 18
10.44INVALID-ORDER-44 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$ . . . 18
10.45INVALID-ORDER-45 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$ . . . 18
10.46INVALID-ORDER-46 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ . . . 18
10.47INVALID-ORDER-47 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$ . . . 18
10.48INVALID-ORDER-48 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ . . . 18
10.49INVALID-ORDER-49 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ . . . 18
10.50INVALID-ORDER-50 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$ . . . 18
10.51INVALID-ORDER-51 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ . . . 19
10.52INVALID-ORDER-52 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$ . . . 19
10.53INVALID-ORDER-53 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$ . . . 19
10.54INVALID-ORDER-54 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$ . . . 19
10.55INVALID-ORDER-55 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ . . . 19
10.56INVALID-ORDER-56 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ . . . 19
10.57INVALID-ORDER-57 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ . . . 19
10.58INVALID-ORDER-58 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$ . . . 19
10.59INVALID-ORDER-59 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$ . . . 20
10.60INVALID-ORDER-60 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ . . . 20
10.61INVALID-ORDER-61 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$ . . . 20

10.62INVALID-ORDER-62 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ 20
10.63INVALID-ORDER-63 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ 20
10.64INVALID-ORDER-64 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$ 20
10.65INVALID-ORDER-65 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ 20
10.66INVALID-ORDER-66 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ 20
10.67INVALID-ORDER-67 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$ 21
10.68INVALID-ORDER-68 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$ 21
10.69INVALID-ORDER-69 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$ 21
10.70INVALID-ORDER-70 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$ 21
10.71INVALID-ORDER-71 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$ 21
10.72INVALID-ORDER-72 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$ 21
10.73INVALID-ORDER-73 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$ 21
10.74INVALID-ORDER-74 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$ 21
10.75INVALID-ORDER-75 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$ 22
10.76INVALID-ORDER-76 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$ 22
10.77INVALID-ORDER-77 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$ 22

1 Examined $H(z)$ for TIA some parasitic Z3 ZL: $\frac{Z_3 Z_L(g_m r_o+1)}{Z_3 g_m r_o+Z_3+Z_L g_m r_o+Z_L}$

$$H(z) = \frac{Z_3 Z_L \left(g_m r_o + 1\right)}{Z_3 g_m r_o + Z_3 + Z_L g_m r_o + Z_L}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L R_3 s}{C_L L_L R_3 s^2 + L_L s + R_3}$$

Parameters:

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

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

$$H(s) = \frac{L_L R_3 R_L s}{C_L L_L R_3 R_L s^2 + L_L R_3 s + L_L R_L s + R_3 R_L}$$

Parameters:

Q: $\frac{C_L R_3 R_L \sqrt{\frac{1}{C_L L_L}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_3+R_L}{C_L R_3 R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: 0
Wz: None

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

$$H(s) = \frac{L_L R_L s}{C_3 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

Parameters:

Q: $R_L \sqrt{\frac{1}{L_L(C_3+C_L)}}\,(C_3 + C_L)$

wo: $\sqrt{\frac{1}{L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
Qz: 0
Wz: None

3.4 BP-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{L_LR_3s}{C_3L_LR_3s^2 + C_LL_LR_3s^2 + L_Ls + R_3}$$

Parameters:

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

3.5 BP-5 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{1}{C_Ls+\frac{1}{R_L}+\frac{1}{L_Ls}}\right)$

$$H(s) = \frac{L_LR_3R_Ls}{C_3L_LR_3R_Ls^2 + C_LL_LR_3R_Ls^2 + L_LR_3s + L_LR_Ls + R_3R_L}$$

Parameters:

Q: $\frac{R_3R_L\sqrt{\frac{1}{L_L(C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{1}{L_L(C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_L}{R_3+R_L}$
Qz: 0
Wz: None

3.6 BP-6 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{L_3R_Ls}{C_3L_3R_Ls^2 + L_3s + R_L}$$

Parameters:

Q: $C_3R_L\sqrt{\frac{1}{C_3L_3}}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{1}{C_3R_L}$
K-LP: 0

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

3.7 BP-7 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{L_3 R_L s}{C_3 L_3 R_L s^2 + C_L L_3 R_L s^2 + L_3 s + R_L}$$

Parameters:

Q: $R_L\sqrt{\frac{1}{L_3(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
Qz: 0
Wz: None

3.8 BP-8 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_3 L_L R_L s}{C_3 L_3 L_L R_L s^2 + C_L L_3 L_L R_L s^2 + L_3 L_L s + L_3 R_L + L_L R_L}$$

Parameters:

Q: $R_L\sqrt{\frac{L_3+L_L}{L_3 L_L(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{L_3+L_L}{L_3 L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_L
Qz: 0
Wz: None

3.9 BP-9 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{C_3 R_3 R_L\sqrt{\frac{1}{C_3 L_3}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_3+R_L}{C_3 R_3 R_L}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: 0

Wz: None

3.10 BP-10 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

Parameters:

Q: $R_3\sqrt{\frac{1}{L_3(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{1}{R_3(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.11 BP-11 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

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

Parameters:

Q: $\frac{R_3 R_L\sqrt{\frac{1}{L_3(C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{1}{L_3(C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3 R_L(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: 0
Wz: None

3.12 BP-12 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

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

Parameters:

Q: $R_3\sqrt{\frac{L_3+L_L}{L_3 L_L(C_3+C_L)}}\,(C_3+C_L)$
wo: $\sqrt{\frac{L_3+L_L}{L_3 L_L(C_3+C_L)}}$
bandwidth: $\frac{1}{R_3(C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.13 BP-13 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_3 L_L R_3 R_L s}{C_3 L_3 L_L R_3 R_L s^2 + C_L L_3 L_L R_3 R_L s^2 + L_3 L_L R_3 s + L_3 L_L R_L s + L_3 R_3 R_L + L_L R_3 R_L}$$

Parameters:

Q: $\frac{R_3 R_L \sqrt{\frac{L_3+L_L}{L_3 L_L (C_3+C_L)}}(C_3+C_L)}{R_3+R_L}$
wo: $\sqrt{\frac{L_3+L_L}{L_3 L_L (C_3+C_L)}}$
bandwidth: $\frac{R_3+R_L}{R_3 R_L (C_3+C_L)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: 0
Wz: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3 \left(C_L L_L s^2 + 1\right)}{C_L L_L s^2 + C_L R_3 s + 1}$$

Parameters:

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

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

$$H(s) = \frac{R_3 R_L \left(C_L L_L s^2 + 1\right)}{C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + R_3 + R_L}$$

Parameters:

Q: $\frac{L_L \sqrt{\frac{1}{C_L L_L}}(R_3+R_L)}{R_3 R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{R_3 R_L}{L_L (R_3+R_L)}$
K-LP: $\frac{R_3 R_L}{R_3+R_L}$

K-HP: $\frac{R_3 R_L}{R_3+R_L}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_L L_L}}$

5.3 BS-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

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

5.4 BS-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

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

6 GE

6.1 GE-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_L L_L s^2 + C_L R_L s + 1\right)}{C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

Parameters:

Q: $\frac{L_L\sqrt{\frac{1}{C_L L_L}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_L L_L}}$

bandwidth: $\frac{R_3+R_L}{L_L}$
K-LP: R_3
K-HP: R_3
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: $\frac{L_L\sqrt{\frac{1}{C_L L_L}}}{R_L}$
Wz: $\sqrt{\frac{1}{C_L L_L}}$

6.2 GE-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1} + R_L\right)$

$$H(s) = \frac{R_3\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_L s + R_3 + R_L}$$

Parameters:

Q: $C_L\sqrt{\frac{1}{C_L L_L}}\,(R_3 + R_L)$
wo: $\sqrt{\frac{1}{C_L L_L}}$
bandwidth: $\frac{1}{C_L(R_3+R_L)}$
K-LP: $\frac{R_3 R_L}{R_3+R_L}$
K-HP: $\frac{R_3 R_L}{R_3+R_L}$
K-BP: R_3
Qz: $C_L R_L\sqrt{\frac{1}{C_L L_L}}$
Wz: $\sqrt{\frac{1}{C_L L_L}}$

6.3 GE-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $\frac{L_3\sqrt{\frac{1}{C_3 L_3}}}{R_3+R_L}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_3+R_L}{L_3}$
K-LP: R_L
K-HP: R_L
K-BP: $\frac{R_3 R_L}{R_3+R_L}$
Qz: $\frac{L_3\sqrt{\frac{1}{C_3 L_3}}}{R_3}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

6.4 GE-4 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ R_L\right)$

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

Parameters:

Q: $C_3\sqrt{\frac{1}{C_3 L_3}}\,(R_3 + R_L)$
wo: $\sqrt{\frac{1}{C_3 L_3}}$

bandwidth: $\frac{1}{C_3(R_3+R_L)}$
K-LP: $\frac{R_3R_L}{R_3+R_L}$
K-HP: $\frac{R_3R_L}{R_3+R_L}$
K-BP: R_L
Qz: $C_3R_3\sqrt{\frac{1}{C_3L_3}}$
Wz: $\sqrt{\frac{1}{C_3L_3}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{R_3\left(C_LR_Ls+1\right)}{C_3C_LR_3R_Ls^2 + C_3R_3s + C_LR_3s + C_LR_Ls + 1}$$

Parameters:

Q: $\frac{C_3C_LR_3R_L\sqrt{\frac{1}{C_3C_LR_3R_L}}}{C_3R_3+C_LR_3+C_LR_L}$
wo: $\sqrt{\frac{1}{C_3C_LR_3R_L}}$
bandwidth: $\frac{C_3R_3+C_LR_3+C_LR_L}{C_3C_LR_3R_L}$
K-LP: R_3
K-HP: 0
K-BP: $\frac{C_LR_3R_L}{C_3R_3+C_LR_3+C_LR_L}$
Qz: 0
Wz: None

8.2 INVALID-NUMER-2 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$$H(s) = \frac{R_L\left(C_3R_3s+1\right)}{C_3C_LR_3R_Ls^2 + C_3R_3s + C_3R_Ls + C_LR_Ls + 1}$$

Parameters:

Q: $\frac{C_3C_LR_3R_L\sqrt{\frac{1}{C_3C_LR_3R_L}}}{C_3R_3+C_3R_L+C_LR_L}$
wo: $\sqrt{\frac{1}{C_3C_LR_3R_L}}$
bandwidth: $\frac{C_3R_3+C_3R_L+C_LR_L}{C_3C_LR_3R_L}$
K-LP: R_L
K-HP: 0
K-BP: $\frac{C_3R_3R_L}{C_3R_3+C_3R_L+C_LR_L}$
Qz: 0
Wz: None

9 INVALID-WZ

10 INVALID-ORDER

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

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

10.2 INVALID-ORDER-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

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

$$H(s) = \frac{R_3 R_L}{C_L R_3 R_L s + R_3 + R_L}$$

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

$$H(s) = \frac{R_3 \left(C_L R_L s + 1\right)}{C_L R_3 s + C_L R_L s + 1}$$

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

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

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

$$H(s) = \frac{1}{s\left(C_3 + C_L\right)}$$

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

$$H(s) = \frac{R_L}{C_3 R_L s + C_L R_L s + 1}$$

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

$$H(s) = \frac{C_L R_L s + 1}{s\left(C_3 C_L R_L s + C_3 + C_L\right)}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{C_L L_L s^2 + 1}{s\left(C_3 C_L L_L s^2 + C_3 + C_L\right)}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$

$$H(s) = \frac{L_L s}{C_3 L_L s^2 + C_L L_L s^2 + 1}$$

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

$$H(s) = \frac{C_L L_L s^2 + C_L R_L s + 1}{s\left(C_3 C_L L_L s^2 + C_3 C_L R_L s + C_3 + C_L\right)}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

$$H(s) = \frac{C_L L_L R_L s^2 + L_L s + R_L}{C_3 C_L L_L R_L s^3 + C_3 L_L s^2 + C_3 R_L s + C_L L_L s^2 + 1}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$$H(s) = \frac{R_L\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_L R_L s^3 + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

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

$$H(s) = \frac{R_3 R_L}{C_3 R_3 R_L s + R_3 + R_L}$$

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

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

10.16 INVALID-ORDER-16 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s + 1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_3 R_L}{C_3 R_3 R_L s + C_L R_3 R_L s + R_3 + R_L}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s + 1},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_L R_3 s^3 + C_3 R_3 s + C_L L_L s^2 + C_L R_3 s + 1}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ L_Ls + R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{R_3\left(C_LL_Ls^2 + C_LR_Ls + 1\right)}{C_3C_LL_LR_3s^3 + C_3C_LR_3R_Ls^2 + C_3R_3s + C_LL_Ls^2 + C_LR_3s + C_LR_Ls + 1}$$

10.19 INVALID-ORDER-19 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1} + R_L\right)$

$$H(s) = \frac{R_3\left(C_LL_LR_Ls^2 + L_Ls + R_L\right)}{C_3C_LL_LR_3R_Ls^3 + C_3L_LR_3s^2 + C_3R_3R_Ls + C_LL_LR_3s^2 + C_LL_LR_Ls^2 + L_Ls + R_3 + R_L}$$

10.20 INVALID-ORDER-20 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L\left(L_Ls+\frac{1}{C_Ls}\right)}{L_Ls+R_L+\frac{1}{C_Ls}}\right)$

$$H(s) = \frac{R_3R_L\left(C_LL_Ls^2 + 1\right)}{C_3C_LL_LR_3R_Ls^3 + C_3R_3R_Ls + C_LL_LR_3s^2 + C_LL_LR_Ls^2 + C_LR_3R_Ls + R_3 + R_L}$$

10.21 INVALID-ORDER-21 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$

$$H(s) = \frac{R_L\left(C_3R_3s + 1\right)}{C_3R_3s + C_3R_Ls + 1}$$

10.22 INVALID-ORDER-22 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$$H(s) = \frac{C_3R_3s + 1}{s\left(C_3C_LR_3s + C_3 + C_L\right)}$$

10.23 INVALID-ORDER-23 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{\left(C_3R_3s + 1\right)\left(C_LR_Ls + 1\right)}{s\left(C_3C_LR_3s + C_3C_LR_Ls + C_3 + C_L\right)}$$

10.24 INVALID-ORDER-24 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{\left(C_3R_3s + 1\right)\left(C_LL_Ls^2 + 1\right)}{s\left(C_3C_LL_Ls^2 + C_3C_LR_3s + C_3 + C_L\right)}$$

10.25 INVALID-ORDER-25 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$$H(s) = \frac{L_Ls\left(C_3R_3s + 1\right)}{C_3C_LL_LR_3s^3 + C_3L_Ls^2 + C_3R_3s + C_LL_Ls^2 + 1}$$

10.26 INVALID-ORDER-26 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls + R_L + \frac{1}{C_Ls}\right)$

$$H(s) = \frac{\left(C_3R_3s + 1\right)\left(C_LL_Ls^2 + C_LR_Ls + 1\right)}{s\left(C_3C_LL_Ls^2 + C_3C_LR_3s + C_3C_LR_Ls + C_3 + C_L\right)}$$

10.27 INVALID-ORDER-27 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_L R_L s \left(C_3 R_3 s + 1\right)}{C_3 C_L L_L R_3 R_L s^3 + C_3 L_L R_3 s^2 + C_3 L_L R_L s^2 + C_3 R_3 R_L s + C_L L_L R_L s^2 + L_L s + R_L}$$

10.28 INVALID-ORDER-28 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

$$H(s) = \frac{\left(C_3 R_3 s + 1\right)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 L_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + 1}$$

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

$$H(s) = \frac{R_L \left(C_3 R_3 s + 1\right)\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

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

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

10.31 INVALID-ORDER-31 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

$$H(s) = \frac{R_L \left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_3 R_L s + C_L R_L s + 1}$$

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

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

10.33 INVALID-ORDER-33 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

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

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

$$H(s) = \frac{L_L s \left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 L_3 s^2 + C_3 L_L s^2 + C_L L_L s^2 + 1}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{\left(C_3 L_3 s^2 + 1\right)\left(C_L L_L s^2 + C_L R_L s + 1\right)}{s\left(C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 C_L R_L s + C_3 + C_L\right)}$$

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

$$H(s) = \frac{L_L R_L s\left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_3 L_L R_L s^2 + C_L L_L R_L s^2 + L_L s + R_L}$$

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

$$H(s) = \frac{\left(C_3 L_3 s^2 + 1\right)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_L s + C_L L_L s^2 + 1}$$

10.38 INVALID-ORDER-38 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$$H(s) = \frac{R_L\left(C_3 L_3 s^2 + 1\right)\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

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

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

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

$$H(s) = \frac{L_3 s\left(C_L R_L s + 1\right)}{C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L R_L s + 1}$$

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

$$H(s) = \frac{L_3 s\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + 1}$$

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

$$H(s) = \frac{L_3 L_L s}{C_3 L_3 L_L s^2 + C_L L_3 L_L s^2 + L_3 + L_L}$$

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

$$H(s) = \frac{L_3 s \left(C_L L_L s^2 + C_L R_L s + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_L s + 1}$$

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

$$H(s) = \frac{L_3 s \left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_L R_L s^2 + L_3 s + L_L s + R_L}$$

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

$$H(s) = \frac{L_3 R_L s \left(C_L L_L s^2 + 1\right)}{C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_3 R_L s^2 + C_L L_L R_L s^2 + L_3 s + R_L}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

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

$$H(s) = \frac{R_L \left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)}{C_3 C_L L_3 R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_3 R_L s + C_L R_L s + 1}$$

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

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

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

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

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

$$H(s) = \frac{L_L s \left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_3 s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_3 s + C_L L_L s^2 + 1}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{\left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)\left(C_L L_L s^2 + C_L R_L s + 1\right)}{s\left(C_3 C_L L_3 s^2 + C_3 C_L L_L s^2 + C_3 C_L R_3 s + C_3 C_L R_L s + C_3 + C_L\right)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_L R_L s\left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)}{C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_L R_3 R_L s^3 + C_3 L_3 L_L s^3 + C_3 L_3 R_L s^2 + C_3 L_L R_3 s^2 + C_3 L_L R_L s^2 + C_3 R_3 R_L s + C_L L_L R_L s^2 + L_L s + R_L}$$

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

$$H(s) = \frac{\left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 L_3 s^2 + C_3 L_L s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + 1}$$

10.54 INVALID-ORDER-54 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$$H(s) = \frac{R_L\left(C_L L_L s^2 + 1\right)\left(C_3 L_3 s^2 + C_3 R_3 s + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_L s^3 + C_3 C_L L_L R_3 s^3 + C_3 C_L L_L R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_3 R_L s + C_L L_L s^2 + C_L R_L s + 1}$$

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{L_3 R_3 s\left(C_L R_L s + 1\right)}{C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_L L_3 R_3 s^2 + C_L L_3 R_L s^2 + C_L R_3 R_L s + L_3 s + R_3}$$

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

$$H(s) = \frac{L_3 R_3 s\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 L_3 R_3 s^2 + C_L L_3 L_L s^3 + C_L L_3 R_3 s^2 + C_L L_L R_3 s^2 + L_3 s + R_3}$$

10.57 INVALID-ORDER-57 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{L_3 R_3 s\left(C_L L_L s^2 + C_L R_L s + 1\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_L L_3 L_L s^3 + C_L L_3 R_3 s^2 + C_L L_3 R_L s^2 + C_L L_L R_3 s^2 + C_L R_3 R_L s + L_3 s + R_3}$$

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

$$H(s) = \frac{L_3 R_3 s\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L R_3 R_L s^4 + C_3 L_3 L_L R_3 s^3 + C_3 L_3 R_3 R_L s^2 + C_L L_3 L_L R_3 s^3 + C_L L_3 L_L R_L s^3 + C_L L_L R_3 R_L s^2 + L_3 L_L s^2 + L_3 R_3 s + L_3 R_L s + L_L R_3 s + R_3 R_L}$$

10.59 INVALID-ORDER-59 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s+\frac{1}{R_3}+\frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$$H(s) = \frac{L_3 R_3 R_L s\left(C_L L_L s^2+1\right)}{C_3 C_L L_3 L_L R_3 R_L s^4 + C_3 L_3 R_3 R_L s^2 + C_L L_3 L_L R_3 s^3 + C_L L_3 L_L R_L s^3 + C_L L_3 R_3 R_L s^2 + C_L L_L R_3 R_L s^2 + L_3 R_3 s + L_3 R_L s + R_3 R_L}$$

10.60 INVALID-ORDER-60 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

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

10.61 INVALID-ORDER-61 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{R_L\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_L L_3 R_L s^2 + C_L R_3 R_L s + L_3 s + R_3 + R_L}$$

10.62 INVALID-ORDER-62 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$

$$H(s) = \frac{\left(C_L R_L s+1\right)\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L R_3 s + C_L R_L s + 1}$$

10.63 INVALID-ORDER-63 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$

$$H(s) = \frac{\left(C_L L_L s^2+1\right)\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_3 s + 1}$$

10.64 INVALID-ORDER-64 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L s\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_L L_3 L_L s^3 + C_L L_L R_3 s^2 + L_3 s + L_L s + R_3}$$

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

$$H(s) = \frac{\left(C_L L_L s^2 + C_L R_L s + 1\right)\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 L_3 s^2 + C_L L_3 s^2 + C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

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

$$H(s) = \frac{L_L R_L s\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 L_L R_3 R_L s^4 + C_3 L_3 L_L R_3 s^3 + C_3 L_3 L_L R_L s^3 + C_3 L_3 R_3 R_L s^2 + C_L L_3 L_L R_L s^3 + C_L L_L R_3 R_L s^2 + L_3 L_L s^2 + L_3 R_L s + L_L R_3 s + L_L R_L s + R_3 R_L}$$

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

$$H(s) = \frac{\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_3 s + L_L s + R_3 + R_L}$$

10.68 INVALID-ORDER-68 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$$H(s) = \frac{R_L\left(C_L L_L s^2 + 1\right)\left(C_3 L_3 R_3 s^2 + L_3 s + R_3\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_L L_3 L_L s^3 + C_L L_3 R_L s^2 + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + L_3 s + R_3 + R_L}$$

10.69 INVALID-ORDER-69 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 R_3 s^3 + C_3 L_3 s^2 + C_3 R_3 s + C_L R_3 s + 1}$$

10.70 INVALID-ORDER-70 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$$H(s) = \frac{R_3 R_L\left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_3 R_3 R_L s + C_L R_3 R_L s + R_3 + R_L}$$

10.71 INVALID-ORDER-71 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_3 L_3 s^2 + 1\right)\left(C_L R_L s + 1\right)}{C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_L R_3 s + C_L R_L s + 1}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_3 L_3 s^2 + 1\right)\left(C_L L_L s^2 + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 C_L L_L R_3 s^3 + C_3 L_3 s^2 + C_3 R_3 s + C_L L_L s^2 + C_L R_3 s + 1}$$

10.73 INVALID-ORDER-73 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$$H(s) = \frac{L_L R_3 s\left(C_3 L_3 s^2 + 1\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_L R_3 s^2 + C_L L_L R_3 s^2 + L_L s + R_3}$$

10.74 INVALID-ORDER-74 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s + \frac{1}{C_3 s}\right)}{L_3 s + R_3 + \frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L s + R_L + \frac{1}{C_L s}\right)$

$$H(s) = \frac{R_3\left(C_3 L_3 s^2 + 1\right)\left(C_L L_L s^2 + C_L R_L s + 1\right)}{C_3 C_L L_3 L_L s^4 + C_3 C_L L_3 R_3 s^3 + C_3 C_L L_3 R_L s^3 + C_3 C_L L_L R_3 s^3 + C_3 C_L R_3 R_L s^2 + C_3 L_3 s^2 + C_3 R_3 s + C_L L_L s^2 + C_L R_3 s + C_L R_L s + 1}$$

10.75 INVALID-ORDER-75 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$

$$H(s) = \frac{L_L R_3 R_L s\left(C_3 L_3 s^2+1\right)}{C_3 C_L L_3 L_L R_3 R_L s^4 + C_3 L_3 L_L R_3 s^3 + C_3 L_3 L_L R_L s^3 + C_3 L_3 R_3 R_L s^2 + C_3 L_L R_3 R_L s^2 + C_L L_L R_3 R_L s^2 + L_L R_3 s + L_L R_L s + R_3 R_L}$$

10.76 INVALID-ORDER-76 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$

$$H(s) = \frac{R_3\left(C_3 L_3 s^2+1\right)\left(C_L L_L R_L s^2 + L_L s + R_L\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_L R_3 R_L s^3 + C_3 L_3 L_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_3 L_L R_3 s^2 + C_3 R_3 R_L s + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + L_L s + R_3 + R_L}$$

10.77 INVALID-ORDER-77 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$$H(s) = \frac{R_3 R_L\left(C_3 L_3 s^2+1\right)\left(C_L L_L s^2+1\right)}{C_3 C_L L_3 L_L R_3 s^4 + C_3 C_L L_3 L_L R_L s^4 + C_3 C_L L_3 R_3 R_L s^3 + C_3 C_L L_L R_3 R_L s^3 + C_3 L_3 R_3 s^2 + C_3 L_3 R_L s^2 + C_3 R_3 R_L s + C_L L_L R_3 s^2 + C_L L_L R_L s^2 + C_L R_3 R_L s + R_3 + R_L}$$