Filter Summary Report: TIA,simple,Z3,Z4

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Contents

1 Examined $H(z)$ for TIA simple Z3 Z4: $\frac{Z_3 Z_4 g_m}{2Z_3 g_m + Z_4 g_m}$

$$H(z) = \frac{Z_3 Z_4 g_m}{2Z_3 g_m + Z_4 g_m}$$

2 HP

3 BP

3.1 BP-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{L_4 s}{C_4 L_4 s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4 R_3 s}{2C_4 L_4 R_3 s^2 + L_4 s + 2R_3}$$

Parameters:

Q: $2C_4 R_3 \sqrt{\frac{1}{C_4 L_4}}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{1}{2C_4 R_3}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.2 BP-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2+L_4 s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4 R_3 R_4 s}{2C_4 L_4 R_3 R_4 s^2 + 2R_3 R_4 + s\left(2L_4 R_3 + L_4 R_4\right)}$$

Parameters:

Q: $\frac{2C_4 R_3 R_4 \sqrt{\frac{1}{C_4 L_4}}}{2R_3+R_4}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2R_3+R_4}{2C_4 R_3 R_4}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_4}{2R_3+R_4}$
Qz: 0
Wz: None

3.3 BP-3 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2+L_4 s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4 R_4 s}{2L_4 s + 2R_4 + s^2\left(C_3 L_4 R_4 + 2C_4 L_4 R_4\right)}$$

Parameters:

Q: $\frac{\sqrt{2} R_4 \sqrt{\frac{1}{L_4(C_3+2C_4)}}(C_3+2C_4)}{2}$
wo: $\sqrt{2}\sqrt{\frac{1}{L_4(C_3+2C_4)}}$
bandwidth: $\frac{2}{R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4}{2}$
Qz: 0

Wz: None

3.4 BP-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \frac{L_4s}{C_4L_4s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4R_3s}{L_4s + 2R_3 + s^2\left(C_3L_4R_3 + 2C_4L_4R_3\right)}$$

Parameters:

Q: $\sqrt{2}R_3\sqrt{\frac{1}{L_4(C_3+2C_4)}}\left(C_3+2C_4\right)$
wo: $\sqrt{2}\sqrt{\frac{1}{L_4(C_3+2C_4)}}$
bandwidth: $\frac{1}{R_3(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.5 BP-5 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \frac{L_4R_4s}{C_4L_4R_4s^2+L_4s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4R_3R_4s}{2R_3R_4 + s^2\left(C_3L_4R_3R_4 + 2C_4L_4R_3R_4\right) + s\left(2L_4R_3 + L_4R_4\right)}$$

Parameters:

Q: $\frac{\sqrt{2}R_3R_4\sqrt{\frac{1}{L_4(C_3+2C_4)}}(C_3+2C_4)}{2R_3+R_4}$
wo: $\sqrt{2}\sqrt{\frac{1}{L_4(C_3+2C_4)}}$
bandwidth: $\frac{2R_3+R_4}{R_3R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_4}{2R_3+R_4}$
Qz: 0
Wz: None

3.6 BP-6 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3s}{C_3L_3s^2+1},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3R_4s}{C_3L_3R_4s^2 + 2L_3s + R_4}$$

Parameters:

Q: $\frac{C_3R_4\sqrt{\frac{1}{C_3L_3}}}{2}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{2}{C_3R_4}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4}{2}$
Qz: 0
Wz: None

3.7 BP-7 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 R_4 s}{2L_3 s + R_4 + s^2\left(C_3 L_3 R_4 + 2C_4 L_3 R_4\right)}$$

Parameters:

Q: $\frac{R_4\sqrt{\frac{1}{L_3(C_3+2C_4)}}(C_3+2C_4)}{2}$
wo: $\sqrt{\frac{1}{L_3(C_3+2C_4)}}$
bandwidth: $\frac{2}{R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4}{2}$
Qz: 0
Wz: None

3.8 BP-8 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2+L_4 s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 L_4 R_4 s}{2L_3 L_4 s + 2L_3 R_4 + L_4 R_4 + s^2\left(C_3 L_3 L_4 R_4 + 2C_4 L_3 L_4 R_4\right)}$$

Parameters:

Q: $\frac{R_4\sqrt{\frac{2L_3+L_4}{L_3 L_4(C_3+2C_4)}}(C_3+2C_4)}{2}$
wo: $\sqrt{\frac{2L_3+L_4}{L_3 L_4(C_3+2C_4)}}$
bandwidth: $\frac{2}{R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_4}{2}$
Qz: 0
Wz: None

3.9 BP-9 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 R_3 R_4 s}{C_3 L_3 R_3 R_4 s^2 + R_3 R_4 + s\left(2L_3 R_3 + L_3 R_4\right)}$$

Parameters:

Q: $\frac{C_3 R_3 R_4\sqrt{\frac{1}{C_3 L_3}}}{2R_3+R_4}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{2R_3+R_4}{C_3 R_3 R_4}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3 R_4}{2R_3+R_4}$
Qz: 0
Wz: None

3.10 BP-10 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 R_3 s}{L_3 s + R_3 + s^2\left(C_3 L_3 R_3 + 2C_4 L_3 R_3\right)}$$

Parameters:

Q: $R_3\sqrt{\frac{1}{L_3(C_3+2C_4)}}\left(C_3+2C_4\right)$
wo: $\sqrt{\frac{1}{L_3(C_3+2C_4)}}$

bandwidth: $\frac{1}{R_3(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.11 BP-11 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \frac{R_4}{C_4R_4s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3R_3R_4s}{R_3R_4 + s^2\left(C_3L_3R_3R_4 + 2C_4L_3R_3R_4\right) + s\left(2L_3R_3 + L_3R_4\right)}$$

Parameters:

Q: $\frac{R_3R_4\sqrt{\frac{1}{L_3(C_3+2C_4)}}(C_3+2C_4)}{2R_3+R_4}$
wo: $\sqrt{\frac{1}{L_3(C_3+2C_4)}}$
bandwidth: $\frac{2R_3+R_4}{R_3R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_4}{2R_3+R_4}$
Qz: 0
Wz: None

3.12 BP-12 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \frac{L_4s}{C_4L_4s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3L_4R_3s}{L_3L_4s + 2L_3R_3 + L_4R_3 + s^2\left(C_3L_3L_4R_3 + 2C_4L_3L_4R_3\right)}$$

Parameters:

Q: $R_3\sqrt{\frac{2L_3+L_4}{L_3L_4(C_3+2C_4)}}\left(C_3+2C_4\right)$
wo: $\sqrt{\frac{2L_3+L_4}{L_3L_4(C_3+2C_4)}}$
bandwidth: $\frac{1}{R_3(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: R_3
Qz: 0
Wz: None

3.13 BP-13 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3R_3s}{C_3L_3R_3s^2+L_3s+R_3},\ \frac{L_4R_4s}{C_4L_4R_4s^2+L_4s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3L_4R_3R_4s}{2L_3R_3R_4 + L_4R_3R_4 + s^2\left(C_3L_3L_4R_3R_4 + 2C_4L_3L_4R_3R_4\right) + s\left(2L_3L_4R_3 + L_3L_4R_4\right)}$$

Parameters:

Q: $\frac{R_3R_4\sqrt{\frac{2L_3+L_4}{L_3L_4(C_3+2C_4)}}(C_3+2C_4)}{2R_3+R_4}$
wo: $\sqrt{\frac{2L_3+L_4}{L_3L_4(C_3+2C_4)}}$
bandwidth: $\frac{2R_3+R_4}{R_3R_4(C_3+2C_4)}$
K-LP: 0
K-HP: 0
K-BP: $\frac{R_3R_4}{2R_3+R_4}$
Qz: 0
Wz: None

4 LP

5 BS

5.1 BS-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 R_3 s^2 + R_3}{C_4 L_4 s^2 + 2 C_4 R_3 s + 1}$$

Parameters:

Q: $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}}}{2 R_3}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2 R_3}{L_4}$
K-LP: R_3
K-HP: R_3
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

5.2 BS-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 R_3 R_4 s^2 + R_3 R_4}{2 C_4 R_3 R_4 s + 2 R_3 + R_4 + s^2 \left(2 C_4 L_4 R_3 + C_4 L_4 R_4\right)}$$

Parameters:

Q: $\frac{L_4 \sqrt{\frac{1}{C_4 L_4}} (2 R_3+R_4)}{2 R_3 R_4}$
wo: $\sqrt{\frac{1}{C_4 L_4}}$
bandwidth: $\frac{2 R_3 R_4}{L_4 (2 R_3+R_4)}$
K-LP: $\frac{R_3 R_4}{2 R_3+R_4}$
K-HP: $\frac{R_3 R_4}{2 R_3+R_4}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_4 L_4}}$

5.3 BS-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_4 s^2 + R_4}{2 C_3 L_3 s^2 + C_3 R_4 s + 2}$$

Parameters:

Q: $\frac{2 L_3 \sqrt{\frac{1}{C_3 L_3}}}{R_4}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{R_4}{2 L_3}$
K-LP: $\frac{R_4}{2}$
K-HP: $\frac{R_4}{2}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

5.4 BS-4 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3L_3R_3R_4s^2 + R_3R_4}{C_3R_3R_4s + 2R_3 + R_4 + s^2\left(2C_3L_3R_3 + C_3L_3R_4\right)}$$

Parameters:

Q: $\frac{L_3\sqrt{\frac{1}{C_3L_3}}(2R_3+R_4)}{R_3R_4}$
wo: $\sqrt{\frac{1}{C_3L_3}}$
bandwidth: $\frac{R_3R_4}{L_3(2R_3+R_4)}$
K-LP: $\frac{R_3R_4}{2R_3+R_4}$
K-HP: $\frac{R_3R_4}{2R_3+R_4}$
K-BP: 0
Qz: None
Wz: $\sqrt{\frac{1}{C_3L_3}}$

6 GE

6.1 GE-1 $Z(s) = \left(\infty,\ \infty,\ R_3,\ L_4s + R_4 + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3s^2 + C_4R_3R_4s + R_3}{C_4L_4s^2 + s\left(2C_4R_3 + C_4R_4\right) + 1}$$

Parameters:

Q: $\frac{L_4\sqrt{\frac{1}{C_4L_4}}}{2R_3+R_4}$
wo: $\sqrt{\frac{1}{C_4L_4}}$
bandwidth: $\frac{2R_3+R_4}{L_4}$
K-LP: R_3
K-HP: R_3
K-BP: $\frac{R_3R_4}{2R_3+R_4}$
Qz: $\frac{L_4\sqrt{\frac{1}{C_4L_4}}}{R_4}$
Wz: $\sqrt{\frac{1}{C_4L_4}}$

6.2 GE-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{L_4s}{C_4L_4s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3R_4s^2 + L_4R_3s + R_3R_4}{L_4s + 2R_3 + R_4 + s^2\left(2C_4L_4R_3 + C_4L_4R_4\right)}$$

Parameters:

Q: $C_4\sqrt{\frac{1}{C_4L_4}}\left(2R_3 + R_4\right)$
wo: $\sqrt{\frac{1}{C_4L_4}}$
bandwidth: $\frac{1}{C_4(2R_3+R_4)}$
K-LP: $\frac{R_3R_4}{2R_3+R_4}$
K-HP: $\frac{R_3R_4}{2R_3+R_4}$
K-BP: R_3
Qz: $C_4R_4\sqrt{\frac{1}{C_4L_4}}$
Wz: $\sqrt{\frac{1}{C_4L_4}}$

6.3 GE-3 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_4 s^2 + C_3 R_3 R_4 s + R_4}{2C_3 L_3 s^2 + s\left(2C_3 R_3 + C_3 R_4\right) + 2}$$

Parameters:

Q: $\frac{2L_3\sqrt{\frac{1}{C_3 L_3}}}{2R_3+R_4}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{2R_3+R_4}{2L_3}$
K-LP: $\frac{R_4}{2}$
K-HP: $\frac{R_4}{2}$
K-BP: $\frac{R_3 R_4}{2R_3+R_4}$
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 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_3 R_4 s^2 + L_3 R_4 s + R_3 R_4}{2L_3 s + 2R_3 + R_4 + s^2\left(2C_3 L_3 R_3 + C_3 L_3 R_4\right)}$$

Parameters:

Q: $\frac{C_3\sqrt{\frac{1}{C_3 L_3}}(2R_3+R_4)}{2}$
wo: $\sqrt{\frac{1}{C_3 L_3}}$
bandwidth: $\frac{2}{C_3(2R_3+R_4)}$
K-LP: $\frac{R_3 R_4}{2R_3+R_4}$
K-HP: $\frac{R_3 R_4}{2R_3+R_4}$
K-BP: $\frac{R_4}{2}$
Qz: $C_3 R_3\sqrt{\frac{1}{C_3 L_3}}$
Wz: $\sqrt{\frac{1}{C_3 L_3}}$

7 AP

8 INVALID-NUMER

8.1 INVALID-NUMER-1 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 R_3 R_4 s + R_3}{C_3 C_4 R_3 R_4 s^2 + s\left(C_3 R_3 + 2C_4 R_3 + C_4 R_4\right) + 1}$$

Parameters:

Q: $\frac{C_3 C_4 R_3 R_4\sqrt{\frac{1}{C_3 C_4 R_3 R_4}}}{C_3 R_3+2C_4 R_3+C_4 R_4}$
wo: $\sqrt{\frac{1}{C_3 C_4 R_3 R_4}}$
bandwidth: $\frac{C_3 R_3+2C_4 R_3+C_4 R_4}{C_3 C_4 R_3 R_4}$
K-LP: R_3
K-HP: 0
K-BP: $\frac{C_4 R_3 R_4}{C_3 R_3+2C_4 R_3+C_4 R_4}$
Qz: 0
Wz: None

8.2 INVALID-NUMER-2 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 R_3 R_4 s + R_4}{2C_3 C_4 R_3 R_4 s^2 + s\left(2C_3 R_3 + C_3 R_4 + 2C_4 R_4\right) + 2}$$

Parameters:

Q: $\frac{2C_3 C_4 R_3 R_4 \sqrt{\frac{1}{C_3 C_4 R_3 R_4}}}{2C_3 R_3 + C_3 R_4 + 2C_4 R_4}$
wo: $\sqrt{\frac{1}{C_3 C_4 R_3 R_4}}$
bandwidth: $\frac{2C_3 R_3 + C_3 R_4 + 2C_4 R_4}{2C_3 C_4 R_3 R_4}$
K-LP: $\frac{R_4}{2}$
K-HP: 0
K-BP: $\frac{C_3 R_3 R_4}{2C_3 R_3 + C_3 R_4 + 2C_4 R_4}$
Qz: 0
Wz: None

9 INVALID-WZ

10 INVALID-ORDER

10.1 INVALID-ORDER-1 $Z(s) = (\infty,\ \infty,\ R_3,\ R_4,\ \infty,\ \infty)$

$$H(s) = \frac{R_3 R_4}{2R_3 + R_4}$$

10.2 INVALID-ORDER-2 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{R_3}{2C_4 R_3 s + 1}$$

10.3 INVALID-ORDER-3 $Z(s) = \left(\infty,\ \infty,\ R_3,\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{R_3 R_4}{2C_4 R_3 R_4 s + 2R_3 + R_4}$$

10.4 INVALID-ORDER-4 $Z(s) = \left(\infty,\ \infty,\ R_3,\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 R_3 R_4 s + R_3}{s\left(2C_4 R_3 + C_4 R_4\right) + 1}$$

10.5 INVALID-ORDER-5 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{R_4}{C_3 R_4 s + 2}$$

10.6 INVALID-ORDER-6 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{1}{s\left(C_3 + 2C_4\right)}$$

10.7 INVALID-ORDER-7 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{R_4}{s\left(C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.8 INVALID-ORDER-8 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 R_4 s + 1}{C_3 C_4 R_4 s^2 + s\left(C_3 + 2C_4\right)}$$

10.9 INVALID-ORDER-9 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 s^2 + 1}{C_3 C_4 L_4 s^3 + s\left(C_3 + 2C_4\right)}$$

10.10 INVALID-ORDER-10 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_4 s}{s^2\left(C_3 L_4 + 2C_4 L_4\right) + 2}$$

10.11 INVALID-ORDER-11 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 s^2 + C_4 R_4 s + 1}{C_3 C_4 L_4 s^3 + C_3 C_4 R_4 s^2 + s\left(C_3 + 2C_4\right)}$$

10.12 INVALID-ORDER-12 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + L_4 s + R_4}{C_3 C_4 L_4 R_4 s^3 + C_3 R_4 s + s^2\left(C_3 L_4 + 2C_4 L_4\right) + 2}$$

10.13 INVALID-ORDER-13 $Z(s) = \left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_4 R_4 s^2 + R_4}{C_3 C_4 L_4 R_4 s^3 + 2C_4 L_4 s^2 + s\left(C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.14 INVALID-ORDER-14 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{R_3 R_4}{C_3 R_3 R_4 s + 2R_3 + R_4}$$

10.15 INVALID-ORDER-15 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{R_3}{s\left(C_3 R_3 + 2C_4 R_3\right) + 1}$$

10.16 INVALID-ORDER-16 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{R_3 R_4}{2R_3 + R_4 + s\left(C_3 R_3 R_4 + 2C_4 R_3 R_4\right)}$$

10.17 INVALID-ORDER-17 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ L_4s + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3s^2 + R_3}{C_3C_4L_4R_3s^3 + C_4L_4s^2 + s\left(C_3R_3 + 2C_4R_3\right) + 1}$$

10.18 INVALID-ORDER-18 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ L_4s + R_4 + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3s^2 + C_4R_3R_4s + R_3}{C_3C_4L_4R_3s^3 + s^2\left(C_3C_4R_3R_4 + C_4L_4\right) + s\left(C_3R_3 + 2C_4R_3 + C_4R_4\right) + 1}$$

10.19 INVALID-ORDER-19 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \frac{L_4s}{C_4L_4s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3R_4s^2 + L_4R_3s + R_3R_4}{C_3C_4L_4R_3R_4s^3 + 2R_3 + R_4 + s^2\left(C_3L_4R_3 + 2C_4L_4R_3 + C_4L_4R_4\right) + s\left(C_3R_3R_4 + L_4\right)}$$

10.20 INVALID-ORDER-20 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \frac{R_4\left(C_4L_4s^2+1\right)}{C_4L_4s^2+C_4R_4s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4L_4R_3R_4s^2 + R_3R_4}{C_3C_4L_4R_3R_4s^3 + 2R_3 + R_4 + s^2\left(2C_4L_4R_3 + C_4L_4R_4\right) + s\left(C_3R_3R_4 + 2C_4R_3R_4\right)}$$

10.21 INVALID-ORDER-21 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3R_3R_4s + R_4}{s\left(2C_3R_3 + C_3R_4\right) + 2}$$

10.22 INVALID-ORDER-22 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3R_3s + 1}{2C_3C_4R_3s^2 + s\left(C_3 + 2C_4\right)}$$

10.23 INVALID-ORDER-23 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ R_4 + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4R_3R_4s^2 + s\left(C_3R_3 + C_4R_4\right) + 1}{s^2\left(2C_3C_4R_3 + C_3C_4R_4\right) + s\left(C_3 + 2C_4\right)}$$

10.24 INVALID-ORDER-24 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ L_4s + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_4R_3s^3 + C_3R_3s + C_4L_4s^2 + 1}{C_3C_4L_4s^3 + 2C_3C_4R_3s^2 + s\left(C_3 + 2C_4\right)}$$

10.25 INVALID-ORDER-25 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ \frac{L_4s}{C_4L_4s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3L_4R_3s^2 + L_4s}{2C_3C_4L_4R_3s^3 + 2C_3R_3s + s^2\left(C_3L_4 + 2C_4L_4\right) + 2}$$

10.26 INVALID-ORDER-26 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3s},\ L_4s + R_4 + \frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_4R_3s^3 + s^2\left(C_3C_4R_3R_4 + C_4L_4\right) + s\left(C_3R_3 + C_4R_4\right) + 1}{C_3C_4L_4s^3 + s^2\left(2C_3C_4R_3 + C_3C_4R_4\right) + s\left(C_3 + 2C_4\right)}$$

10.27 INVALID-ORDER-27 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_4 R_3 R_4 s^2 + L_4 R_4 s}{2C_3 C_4 L_4 R_3 R_4 s^3 + 2R_4 + s^2\left(2C_3 L_4 R_3 + C_3 L_4 R_4 + 2C_4 L_4 R_4\right) + s\left(2C_3 R_3 R_4 + 2L_4\right)}$$

10.28 INVALID-ORDER-28 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_4 R_3 R_4 s^3 + R_4 + s^2\left(C_3 L_4 R_3 + C_4 L_4 R_4\right) + s\left(C_3 R_3 R_4 + L_4\right)}{s^3\left(2C_3 C_4 L_4 R_3 + C_3 C_4 L_4 R_4\right) + s^2\left(C_3 L_4 + 2C_4 L_4\right) + s\left(2C_3 R_3 + C_3 R_4\right) + 2}$$

10.29 INVALID-ORDER-29 $Z(s) = \left(\infty,\ \infty,\ R_3 + \frac{1}{C_3 s},\ \frac{R_4\left(C_4 L_4 s^2 + 1\right)}{C_4 L_4 s^2 + C_4 R_4 s + 1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_4 R_3 R_4 s^3 + C_3 R_3 R_4 s + C_4 L_4 R_4 s^2 + R_4}{s^3\left(2C_3 C_4 L_4 R_3 + C_3 C_4 L_4 R_4\right) + s^2\left(2C_3 C_4 R_3 R_4 + 2C_4 L_4\right) + s\left(2C_3 R_3 + C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.30 INVALID-ORDER-30 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 s^2 + 1}{2C_3 C_4 L_3 s^3 + s\left(C_3 + 2C_4\right)}$$

10.31 INVALID-ORDER-31 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{R_4}{C_4 R_4 s + 1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_4 s^2 + R_4}{2C_3 C_4 L_3 R_4 s^3 + 2C_3 L_3 s^2 + s\left(C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.32 INVALID-ORDER-32 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 R_4 s^3 + C_3 L_3 s^2 + C_4 R_4 s + 1}{2C_3 C_4 L_3 s^3 + C_3 C_4 R_4 s^2 + s\left(C_3 + 2C_4\right)}$$

10.33 INVALID-ORDER-33 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 s^4 + s^2\left(C_3 L_3 + C_4 L_4\right) + 1}{s^3\left(2C_3 C_4 L_3 + C_3 C_4 L_4\right) + s\left(C_3 + 2C_4\right)}$$

10.34 INVALID-ORDER-34 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2 + 1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 s^3 + L_4 s}{2C_3 C_4 L_3 L_4 s^4 + s^2\left(2C_3 L_3 + C_3 L_4 + 2C_4 L_4\right) + 2}$$

10.35 INVALID-ORDER-35 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 s^4 + C_3 C_4 L_3 R_4 s^3 + C_4 R_4 s + s^2\left(C_3 L_3 + C_4 L_4\right) + 1}{C_3 C_4 R_4 s^2 + s^3\left(2C_3 C_4 L_3 + C_3 C_4 L_4\right) + s\left(C_3 + 2C_4\right)}$$

10.36 INVALID-ORDER-36 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2 + L_4 s + R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 R_4 s^3 + L_4 R_4 s}{2C_3 C_4 L_3 L_4 R_4 s^4 + 2C_3 L_3 L_4 s^3 + 2L_4 s + 2R_4 + s^2 \left(2C_3 L_3 R_4 + C_3 L_4 R_4 + 2C_4 L_4 R_4\right)}$$

10.37 INVALID-ORDER-37 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_4 s^4 + C_3 L_3 L_4 s^3 + L_4 s + R_4 + s^2 \left(C_3 L_3 R_4 + C_4 L_4 R_4\right)}{2C_3 C_4 L_3 L_4 s^4 + C_3 C_4 L_4 R_4 s^3 + C_3 R_4 s + s^2 \left(2C_3 L_3 + C_3 L_4 + 2C_4 L_4\right) + 2}$$

10.38 INVALID-ORDER-38 $Z(s) = \left(\infty,\ \infty,\ L_3 s + \frac{1}{C_3 s},\ \frac{R_4\left(C_4 L_4 s^2 + 1\right)}{C_4 L_4 s^2 + C_4 R_4 s + 1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_4 s^4 + R_4 + s^2 \left(C_3 L_3 R_4 + C_4 L_4 R_4\right)}{2C_3 C_4 L_3 L_4 s^4 + s^3 \left(2C_3 C_4 L_3 R_4 + C_3 C_4 L_4 R_4\right) + s^2 \left(2C_3 L_3 + 2C_4 L_4\right) + s \left(C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.39 INVALID-ORDER-39 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 s}{s^2 \left(C_3 L_3 + 2C_4 L_3\right) + 1}$$

10.40 INVALID-ORDER-40 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 R_4 s^2 + L_3 s}{C_3 C_4 L_3 R_4 s^3 + C_4 R_4 s + s^2 \left(C_3 L_3 + 2C_4 L_3\right) + 1}$$

10.41 INVALID-ORDER-41 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 s^3 + L_3 s}{C_3 C_4 L_3 L_4 s^4 + s^2 \left(C_3 L_3 + 2C_4 L_3 + C_4 L_4\right) + 1}$$

10.42 INVALID-ORDER-42 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \frac{L_4 s}{C_4 L_4 s^2 + 1},\ \infty,\ \infty\right)$

$$H(s) = \frac{L_3 L_4 s}{2L_3 + L_4 + s^2 \left(C_3 L_3 L_4 + 2C_4 L_3 L_4\right)}$$

10.43 INVALID-ORDER-43 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 s^3 + C_4 L_3 R_4 s^2 + L_3 s}{C_3 C_4 L_3 L_4 s^4 + C_3 C_4 L_3 R_4 s^3 + C_4 R_4 s + s^2 \left(C_3 L_3 + 2C_4 L_3 + C_4 L_4\right) + 1}$$

10.44 INVALID-ORDER-44 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1},\ \frac{L_4 s}{C_4 L_4 s^2 + 1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_4 s^3 + L_3 L_4 s^2 + L_3 R_4 s}{C_3 C_4 L_3 L_4 R_4 s^4 + R_4 + s^3 \left(C_3 L_3 L_4 + 2C_4 L_3 L_4\right) + s^2 \left(C_3 L_3 R_4 + C_4 L_4 R_4\right) + s \left(2L_3 + L_4\right)}$$

10.45 INVALID-ORDER-45 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_4 s^3 + L_3 R_4 s}{C_3 C_4 L_3 L_4 R_4 s^4 + 2C_4 L_3 L_4 s^3 + 2L_3 s + R_4 + s^2\left(C_3 L_3 R_4 + 2C_4 L_3 R_4 + C_4 L_4 R_4\right)}$$

10.46 INVALID-ORDER-46 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 s^2 + C_3 R_3 s + 1}{2C_3 C_4 L_3 s^3 + 2C_3 C_4 R_3 s^2 + s\left(C_3 + 2C_4\right)}$$

10.47 INVALID-ORDER-47 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_4 s^2 + C_3 R_3 R_4 s + R_4}{2C_3 C_4 L_3 R_4 s^3 + s^2\left(2C_3 C_4 R_3 R_4 + 2C_3 L_3\right) + s\left(2C_3 R_3 + C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.48 INVALID-ORDER-48 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 R_4 s^3 + s^2\left(C_3 C_4 R_3 R_4 + C_3 L_3\right) + s\left(C_3 R_3 + C_4 R_4\right) + 1}{2C_3 C_4 L_3 s^3 + s^2\left(2C_3 C_4 R_3 + C_3 C_4 R_4\right) + s\left(C_3 + 2C_4\right)}$$

10.49 INVALID-ORDER-49 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 s^4 + C_3 C_4 L_4 R_3 s^3 + C_3 R_3 s + s^2\left(C_3 L_3 + C_4 L_4\right) + 1}{2C_3 C_4 R_3 s^2 + s^3\left(2C_3 C_4 L_3 + C_3 C_4 L_4\right) + s\left(C_3 + 2C_4\right)}$$

10.50 INVALID-ORDER-50 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 s^3 + C_3 L_4 R_3 s^2 + L_4 s}{2C_3 C_4 L_3 L_4 s^4 + 2C_3 C_4 L_4 R_3 s^3 + 2C_3 R_3 s + s^2\left(2C_3 L_3 + C_3 L_4 + 2C_4 L_4\right) + 2}$$

10.51 INVALID-ORDER-51 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 s^4 + s^3\left(C_3 C_4 L_3 R_4 + C_3 C_4 L_4 R_3\right) + s^2\left(C_3 C_4 R_3 R_4 + C_3 L_3 + C_4 L_4\right) + s\left(C_3 R_3 + C_4 R_4\right) + 1}{s^3\left(2C_3 C_4 L_3 + C_3 C_4 L_4\right) + s^2\left(2C_3 C_4 R_3 + C_3 C_4 R_4\right) + s\left(C_3 + 2C_4\right)}$$

10.52 INVALID-ORDER-52 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2+L_4 s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 R_4 s^3 + C_3 L_4 R_3 R_4 s^2 + L_4 R_4 s}{2C_3 C_4 L_3 L_4 R_4 s^4 + 2R_4 + s^3\left(2C_3 C_4 L_4 R_3 R_4 + 2C_3 L_3 L_4\right) + s^2\left(2C_3 L_3 R_4 + 2C_3 L_4 R_3 + C_3 L_4 R_4 + 2C_4 L_4 R_4\right) + s\left(2C_3 R_3 R_4 + 2L_4\right)}$$

10.53 INVALID-ORDER-53 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{L_4 s}{C_4 L_4 s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_4 s^4 + R_4 + s^3\left(C_3 C_4 L_4 R_3 R_4 + C_3 L_3 L_4\right) + s^2\left(C_3 L_3 R_4 + C_3 L_4 R_3 + C_4 L_4 R_4\right) + s\left(C_3 R_3 R_4 + L_4\right)}{2C_3 C_4 L_3 L_4 s^4 + s^3\left(2C_3 C_4 L_4 R_3 + C_3 C_4 L_4 R_4\right) + s^2\left(2C_3 L_3 + C_3 L_4 + 2C_4 L_4\right) + s\left(2C_3 R_3 + C_3 R_4\right) + 2}$$

10.54 INVALID-ORDER-54 $Z(s) = \left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_4 s^4 + C_3 C_4 L_4 R_3 R_4 s^3 + C_3 R_3 R_4 s + R_4 + s^2 \left(C_3 L_3 R_4 + C_4 L_4 R_4\right)}{2C_3 C_4 L_3 L_4 s^4 + s^3 \left(2C_3 C_4 L_3 R_4 + 2C_3 C_4 L_4 R_3 + C_3 C_4 L_4 R_4\right) + s^2 \left(2C_3 C_4 R_3 R_4 + 2C_3 L_3 + 2C_4 L_4\right) + s \left(2C_3 R_3 + C_3 R_4 + 2C_4 R_4\right) + 2}$$

10.55 INVALID-ORDER-55 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 R_3 R_4 s^2 + L_3 R_3 s}{C_3 C_4 L_3 R_3 R_4 s^3 + R_3 + s^2 \left(C_3 L_3 R_3 + 2C_4 L_3 R_3 + C_4 L_3 R_4\right) + s \left(C_4 R_3 R_4 + L_3\right)}$$

10.56 INVALID-ORDER-56 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_3 s^3 + L_3 R_3 s}{C_3 C_4 L_3 L_4 R_3 s^4 + C_4 L_3 L_4 s^3 + L_3 s + R_3 + s^2 \left(C_3 L_3 R_3 + 2C_4 L_3 R_3 + C_4 L_4 R_3\right)}$$

10.57 INVALID-ORDER-57 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_3 s^3 + C_4 L_3 R_3 R_4 s^2 + L_3 R_3 s}{C_3 C_4 L_3 L_4 R_3 s^4 + R_3 + s^3 \left(C_3 C_4 L_3 R_3 R_4 + C_4 L_3 L_4\right) + s^2 \left(C_3 L_3 R_3 + 2C_4 L_3 R_3 + C_4 L_3 R_4 + C_4 L_4 R_3\right) + s \left(C_4 R_3 R_4 + L_3\right)}$$

10.58 INVALID-ORDER-58 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ \frac{L_4 s}{C_4 L_4 s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_3 R_4 s^3 + L_3 L_4 R_3 s^2 + L_3 R_3 R_4 s}{C_3 C_4 L_3 L_4 R_3 R_4 s^4 + R_3 R_4 + s^3 \left(C_3 L_3 L_4 R_3 + 2C_4 L_3 L_4 R_3 + C_4 L_3 L_4 R_4\right) + s^2 \left(C_3 L_3 R_3 R_4 + C_4 L_4 R_3 R_4 + L_3 L_4\right) + s \left(2L_3 R_3 + L_3 R_4 + L_4 R_3\right)}$$

10.59 INVALID-ORDER-59 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 R_3 s}{C_3 L_3 R_3 s^2+L_3 s+R_3},\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_4 L_3 L_4 R_3 R_4 s^3 + L_3 R_3 R_4 s}{C_3 C_4 L_3 L_4 R_3 R_4 s^4 + R_3 R_4 + s^3 \left(2C_4 L_3 L_4 R_3 + C_4 L_3 L_4 R_4\right) + s^2 \left(C_3 L_3 R_3 R_4 + 2C_4 L_3 R_3 R_4 + C_4 L_4 R_3 R_4\right) + s \left(2L_3 R_3 + L_3 R_4\right)}$$

10.60 INVALID-ORDER-60 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_3 s^2 + L_3 s + R_3}{2C_3 C_4 L_3 R_3 s^3 + 2C_4 R_3 s + s^2 \left(C_3 L_3 + 2C_4 L_3\right) + 1}$$

10.61 INVALID-ORDER-61 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_3 R_4 s^2 + L_3 R_4 s + R_3 R_4}{2C_3 C_4 L_3 R_3 R_4 s^3 + 2R_3 + R_4 + s^2 \left(2C_3 L_3 R_3 + C_3 L_3 R_4 + 2C_4 L_3 R_4\right) + s \left(2C_4 R_3 R_4 + 2L_3\right)}$$

10.62 INVALID-ORDER-62 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 R_3 R_4 s^3 + R_3 + s^2 \left(C_3 L_3 R_3 + C_4 L_3 R_4\right) + s \left(C_4 R_3 R_4 + L_3\right)}{s^3 \left(2C_3 C_4 L_3 R_3 + C_3 C_4 L_3 R_4\right) + s^2 \left(C_3 L_3 + 2C_4 L_3\right) + s \left(2C_4 R_3 + C_4 R_4\right) + 1}$$

10.63 INVALID-ORDER-63 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ L_4 s + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_3 s^4 + C_4 L_3 L_4 s^3 + L_3 s + R_3 + s^2 \left(C_3 L_3 R_3 + C_4 L_4 R_3\right)}{C_3 C_4 L_3 L_4 s^4 + 2 C_3 C_4 L_3 R_3 s^3 + 2 C_4 R_3 s + s^2 \left(C_3 L_3 + 2 C_4 L_3 + C_4 L_4\right) + 1}$$

10.64 INVALID-ORDER-64 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{L_4 s}{C_4 L_4 s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 R_3 s^3 + L_3 L_4 s^2 + L_4 R_3 s}{2 C_3 C_4 L_3 L_4 R_3 s^4 + 2 R_3 + s^3 \left(C_3 L_3 L_4 + 2 C_4 L_3 L_4\right) + s^2 \left(2 C_3 L_3 R_3 + 2 C_4 L_4 R_3\right) + s \left(2 L_3 + L_4\right)}$$

10.65 INVALID-ORDER-65 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ L_4 s + R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_3 s^4 + R_3 + s^3 \left(C_3 C_4 L_3 R_3 R_4 + C_4 L_3 L_4\right) + s^2 \left(C_3 L_3 R_3 + C_4 L_3 R_4 + C_4 L_4 R_3\right) + s \left(C_4 R_3 R_4 + L_3\right)}{C_3 C_4 L_3 L_4 s^4 + s^3 \left(2 C_3 C_4 L_3 R_3 + C_3 C_4 L_3 R_4\right) + s^2 \left(C_3 L_3 + 2 C_4 L_3 + C_4 L_4\right) + s \left(2 C_4 R_3 + C_4 R_4\right) + 1}$$

10.66 INVALID-ORDER-66 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{L_4 R_4 s}{C_4 L_4 R_4 s^2+L_4 s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 L_4 R_3 R_4 s^3 + L_3 L_4 R_4 s^2 + L_4 R_3 R_4 s}{2 C_3 C_4 L_3 L_4 R_3 R_4 s^4 + 2 R_3 R_4 + s^3 \left(2 C_3 L_3 L_4 R_3 + C_3 L_3 L_4 R_4 + 2 C_4 L_3 L_4 R_4\right) + s^2 \left(2 C_3 L_3 R_3 R_4 + 2 C_4 L_4 R_3 R_4 + 2 L_3 L_4\right) + s \left(2 L_3 R_4 + 2 L_4 R_3 + L_4 R_4\right)}$$

10.67 INVALID-ORDER-67 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{L_4 s}{C_4 L_4 s^2+1} + R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_3 R_4 s^4 + R_3 R_4 + s^3 \left(C_3 L_3 L_4 R_3 + C_4 L_3 L_4 R_4\right) + s^2 \left(C_3 L_3 R_3 R_4 + C_4 L_4 R_3 R_4 + L_3 L_4\right) + s \left(L_3 R_4 + L_4 R_3\right)}{2 R_3 + R_4 + s^4 \left(2 C_3 C_4 L_3 L_4 R_3 + C_3 C_4 L_3 L_4 R_4\right) + s^3 \left(C_3 L_3 L_4 + 2 C_4 L_3 L_4\right) + s^2 \left(2 C_3 L_3 R_3 + C_3 L_3 R_4 + 2 C_4 L_4 R_3 + C_4 L_4 R_4\right) + s \left(2 L_3 + L_4\right)}$$

10.68 INVALID-ORDER-68 $Z(s) = \left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1} + R_3,\ \frac{R_4\left(C_4 L_4 s^2+1\right)}{C_4 L_4 s^2+C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 L_4 R_3 R_4 s^4 + C_4 L_3 L_4 R_4 s^3 + L_3 R_4 s + R_3 R_4 + s^2 \left(C_3 L_3 R_3 R_4 + C_4 L_4 R_3 R_4\right)}{2 R_3 + R_4 + s^4 \left(2 C_3 C_4 L_3 L_4 R_3 + C_3 C_4 L_3 L_4 R_4\right) + s^3 \left(2 C_3 C_4 L_3 R_3 R_4 + 2 C_4 L_3 L_4\right) + s^2 \left(2 C_3 L_3 R_3 + C_3 L_3 R_4 + 2 C_4 L_3 R_4 + 2 C_4 L_4 R_3 + C_4 L_4 R_4\right) + s \left(2 C_4 R_3 R_4 + 2 L_3\right)}$$

10.69 INVALID-ORDER-69 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_3 s^2 + R_3}{2 C_3 C_4 L_3 R_3 s^3 + C_3 L_3 s^2 + s \left(C_3 R_3 + 2 C_4 R_3\right) + 1}$$

10.70 INVALID-ORDER-70 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ \frac{R_4}{C_4 R_4 s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 L_3 R_3 R_4 s^2 + R_3 R_4}{2 C_3 C_4 L_3 R_3 R_4 s^3 + 2 R_3 + R_4 + s^2 \left(2 C_3 L_3 R_3 + C_3 L_3 R_4\right) + s \left(C_3 R_3 R_4 + 2 C_4 R_3 R_4\right)}$$

10.71 INVALID-ORDER-71 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3 L_3 s^2+1\right)}{C_3 L_3 s^2+C_3 R_3 s+1},\ R_4 + \frac{1}{C_4 s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3 C_4 L_3 R_3 R_4 s^3 + C_3 L_3 R_3 s^2 + C_4 R_3 R_4 s + R_3}{s^3 \left(2 C_3 C_4 L_3 R_3 + C_3 C_4 L_3 R_4\right) + s^2 \left(C_3 C_4 R_3 R_4 + C_3 L_3\right) + s \left(C_3 R_3 + 2 C_4 R_3 + C_4 R_4\right) + 1}$$

10.72 INVALID-ORDER-72 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ L_4s+\frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_3L_4R_3s^4 + R_3 + s^2\left(C_3L_3R_3 + C_4L_4R_3\right)}{C_3C_4L_3L_4s^4 + s^3\left(2C_3C_4L_3R_3 + C_3C_4L_4R_3\right) + s^2\left(C_3L_3 + C_4L_4\right) + s\left(C_3R_3 + 2C_4R_3\right) + 1}$$

10.73 INVALID-ORDER-73 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \frac{L_4s}{C_4L_4s^2+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3L_3L_4R_3s^3 + L_4R_3s}{2C_3C_4L_3L_4R_3s^4 + C_3L_3L_4s^3 + L_4s + 2R_3 + s^2\left(2C_3L_3R_3 + C_3L_4R_3 + 2C_4L_4R_3\right)}$$

10.74 INVALID-ORDER-74 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ L_4s+R_4+\frac{1}{C_4s},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_3L_4R_3s^4 + C_3C_4L_3R_3R_4s^3 + C_4R_3R_4s + R_3 + s^2\left(C_3L_3R_3 + C_4L_4R_3\right)}{C_3C_4L_3L_4s^4 + s^3\left(2C_3C_4L_3R_3 + C_3C_4L_3R_4 + C_3C_4L_4R_3\right) + s^2\left(C_3C_4R_3R_4 + C_3L_3 + C_4L_4\right) + s\left(C_3R_3 + 2C_4R_3 + C_4R_4\right) + 1}$$

10.75 INVALID-ORDER-75 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \frac{L_4R_4s}{C_4L_4R_4s^2+L_4s+R_4},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3L_3L_4R_3R_4s^3 + L_4R_3R_4s}{2C_3C_4L_3L_4R_3R_4s^4 + 2R_3R_4 + s^3\left(2C_3L_3L_4R_3 + C_3L_3L_4R_4\right) + s^2\left(2C_3L_3R_3R_4 + C_3L_4R_3R_4 + 2C_4L_4R_3R_4\right) + s\left(2L_4R_3 + L_4R_4\right)}$$

10.76 INVALID-ORDER-76 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \frac{L_4s}{C_4L_4s^2+1}+R_4,\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_3L_4R_3R_4s^4 + C_3L_3L_4R_3s^3 + L_4R_3s + R_3R_4 + s^2\left(C_3L_3R_3R_4 + C_4L_4R_3R_4\right)}{2R_3 + R_4 + s^4\left(2C_3C_4L_3L_4R_3 + C_3C_4L_3L_4R_4\right) + s^3\left(C_3C_4L_4R_3R_4 + C_3L_3L_4\right) + s^2\left(2C_3L_3R_3 + C_3L_3R_4 + C_3L_4R_3 + 2C_4L_4R_3 + C_4L_4R_4\right) + s\left(C_3R_3R_4 + L_4\right)}$$

10.77 INVALID-ORDER-77 $Z(s) = \left(\infty,\ \infty,\ \frac{R_3\left(C_3L_3s^2+1\right)}{C_3L_3s^2+C_3R_3s+1},\ \frac{R_4\left(C_4L_4s^2+1\right)}{C_4L_4s^2+C_4R_4s+1},\ \infty,\ \infty\right)$

$$H(s) = \frac{C_3C_4L_3L_4R_3R_4s^4 + R_3R_4 + s^2\left(C_3L_3R_3R_4 + C_4L_4R_3R_4\right)}{2R_3 + R_4 + s^4\left(2C_3C_4L_3L_4R_3 + C_3C_4L_3L_4R_4\right) + s^3\left(2C_3C_4L_3R_3R_4 + C_3C_4L_4R_3R_4\right) + s^2\left(2C_3L_3R_3 + C_3L_3R_4 + 2C_4L_4R_3 + C_4L_4R_4\right) + s\left(C_3R_3R_4 + 2C_4R_3R_4\right)}$$

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