Filter Summary Report: TIA,simple,Z1
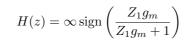
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Contents

1 Examined $H(z)$ for TIA simple Z1: $\infty \, \text{sign}\left(\frac{Z_1 g_m}{Z_1 g_m + 1}\right)$

$$H(z) = \infty \, \text{sign}\left(\frac{Z_1 g_m}{Z_1 g_m + 1}\right)$$

2 HP

3 BP

4 LP

5 BS

6 GE

7 AP

8 INVALID-NUMER

9 INVALID-WZ

10 INVALID-ORDER

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

$$H(s) = \infty \, \text{sign}\left(\frac{R_1 g_m}{R_1 g_m + 1}\right)$$

11 PolynomialError

11.1 PolynomialError-1 $Z(s) = (L_1 s, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{L_1 g_m s}{L_1 g_m s + 1} = 0 \\ \frac{\infty L_1 g_m s}{(L_1 g_m s + 1)\left|\frac{L_1 g_m s}{L_1 g_m s + 1}\right|} & \textbf{otherwise} \end{cases}$$

11.2 PolynomialError-2 $Z(s) = \left(\frac{1}{C_1 s}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty\right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{g_m}{C_1 s + g_m} = 0 \\ \frac{\infty g_m}{(C_1 s + g_m)\left|\frac{g_m}{C_1 s + g_m}\right|} & \textbf{otherwise} \end{cases}$$

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

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{R_1 g_m}{C_1 R_1 s + R_1 g_m + 1} = 0 \\ \frac{\infty R_1 g_m}{(C_1 R_1 s + R_1 g_m + 1)\left| \frac{R_1 g_m}{C_1 R_1 s + R_1 g_m + 1} \right|} & \textbf{otherwise} \end{cases}$$

11.4 PolynomialError-4 $Z(s) = \left(R_1 + \frac{1}{C_1 s}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{g_m(C_1 R_1 s + 1)}{C_1 s + g_m(C_1 R_1 s + 1)} = 0 \\ \frac{\infty g_m(C_1 R_1 s + 1)}{(C_1 s + g_m(C_1 R_1 s + 1))\left| \frac{g_m(C_1 R_1 s + 1)}{C_1 s + g_m(C_1 R_1 s + 1)} \right|} & \textbf{otherwise} \end{cases}$$

11.5 PolynomialError-5 $Z(s) = \left(L_1 s + \frac{1}{C_1 s}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{g_m\left(C_1 L_1 s^2 + 1\right)}{C_1 s + g_m(C_1 L_1 s^2 + 1)} = 0 \\ \frac{\infty g_m\left(C_1 L_1 s^2 + 1\right)}{(C_1 s + g_m(C_1 L_1 s^2 + 1))\left| \frac{g_m(C_1 L_1 s^2 + 1)}{C_1 s + g_m(C_1 L_1 s^2 + 1)} \right|} & \textbf{otherwise} \end{cases}$$

11.6 PolynomialError-6 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{L_1 g_m s}{C_1 L_1 s^2 + L_1 g_m s + 1} = 0 \\ \frac{\infty L_1 g_m s}{(C_1 L_1 s^2 + L_1 g_m s + 1)\left| \frac{L_1 g_m s}{C_1 L_1 s^2 + L_1 g_m s + 1} \right|} & \textbf{otherwise} \end{cases}$$

11.7 PolynomialError-7 $Z(s) = \left(L_1 s + R_1 + \frac{1}{C_1 s}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{g_m(C_1 s(L_1 s + R_1) + 1)}{C_1 s + g_m(C_1 s(L_1 s + R_1) + 1)} = 0 \\ \frac{\infty g_m(C_1 s(L_1 s + R_1) + 1)}{(C_1 s + g_m(C_1 s(L_1 s + R_1) + 1))\left| \frac{g_m(C_1 s(L_1 s + R_1) + 1)}{C_1 s + g_m(C_1 s(L_1 s + R_1) + 1)} \right|} & \textbf{otherwise} \end{cases}$$

11.8 PolynomialError-8 $Z(s) = \left(\frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{L_1 R_1 g_m s}{C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1} = 0 \\ \frac{\infty L_1 R_1 g_m s}{(C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1)\left| \frac{L_1 R_1 g_m s}{C_1 L_1 R_1 s^2 + L_1 R_1 g_m s + L_1 s + R_1} \right|} & \textbf{otherwise} \end{cases}$$

11.9 PolynomialError-9 $Z(s) = \left(\frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{g_m\left(L_1 s + R_1\left(C_1 L_1 s^2 + 1\right)\right)}{C_1 L_1 s^2 + g_m(L_1 s + R_1(C_1 L_1 s^2 + 1)) + 1} = 0 \\ \frac{\infty g_m\left(L_1 s + R_1\left(C_1 L_1 s^2 + 1\right)\right)}{(C_1 L_1 s^2 + g_m(L_1 s + R_1(C_1 L_1 s^2 + 1)) + 1)\left| \frac{g_m(L_1 s + R_1(C_1 L_1 s^2 + 1))}{C_1 L_1 s^2 + g_m(L_1 s + R_1(C_1 L_1 s^2 + 1)) + 1} \right|} & \textbf{otherwise} \end{cases}$$

11.10 PolynomialError-10 $Z(s) = \left(\frac{R_1\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \ \infty, \ \infty, \ \infty, \ \infty, \ \infty \right)$

$$H(s) = \begin{cases} \textbf{NaN} & \textbf{for } \frac{R_1 g_m\left(C_1 L_1 s^2 + 1\right)}{C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m(C_1 L_1 s^2 + 1) + 1} = 0 \\ \frac{\infty R_1 g_m\left(C_1 L_1 s^2 + 1\right)}{(C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m(C_1 L_1 s^2 + 1) + 1)\left| \frac{R_1 g_m(C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + R_1 g_m(C_1 L_1 s^2 + 1) + 1} \right|} & \textbf{otherwise} \end{cases}$$