Filter Summary Report: TIA,simple,Z1

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Contents

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

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

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 $Z(s) = (R_1,\ \infty,\ \infty,\ \infty,\ \infty,\ \infty)$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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