

# Filter Summary Report: TIA,simple,Z1

Generated by MacAnalog-Symbolix

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

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

10.2   INVALID-ORDER-2  $Z(s) = (L_1 s, \infty, \infty, \infty, \infty, \infty)$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

10.3   INVALID-ORDER-3  $Z(s) = \left(\frac{1}{C_1 s}, \infty, \infty, \infty, \infty, \infty\right)$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.4 \quad \text{INVALID-ORDER-4} \quad Z(s) = \left( \frac{R_1}{C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.5 \quad \text{INVALID-ORDER-5} \quad Z(s) = \left( R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.6 \quad \text{INVALID-ORDER-6} \quad Z(s) = \left( L_1 s + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.7 \quad \text{INVALID-ORDER-7} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.8 \quad \text{INVALID-ORDER-8} \quad Z(s) = \left( L_1 s + R_1 + \frac{1}{C_1 s}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.9 \quad \text{INVALID-ORDER-9} \quad Z(s) = \left( \frac{L_1 R_1 s}{C_1 L_1 R_1 s^2 + L_1 s + R_1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.10 \quad \text{INVALID-ORDER-10} \quad Z(s) = \left( \frac{L_1 s}{C_1 L_1 s^2 + 1} + R_1, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$

$$10.11 \quad \text{INVALID-ORDER-11} \quad Z(s) = \left( \frac{R_1 (C_1 L_1 s^2 + 1)}{C_1 L_1 s^2 + C_1 R_1 s + 1}, \quad \infty, \quad \infty, \quad \infty, \quad \infty, \quad \infty \right)$$

$$H(s) = \begin{cases} \text{NaN} & \text{for } \frac{Z_1 g_m}{Z_1 g_m + 1} = 0 \\ \frac{\infty Z_1 g_m}{(Z_1 g_m + 1) \left| \frac{Z_1 g_m}{Z_1 g_m + 1} \right|} & \text{otherwise} \end{cases}$$