

The equation for output voltage in terms of input current is defined

$$\text{as } V(t) = -G e^{-\zeta \omega_0 t} ((\zeta \omega_0 \sin(\omega_d t) - \omega_d \cos(\omega_d t)) B + (\omega_d \sin(\omega_0 t) - \zeta \omega_0 \cos(\omega_d t)) A) \quad \text{Eq. 1}$$

where

$$\omega_d = \omega_0 \sqrt{1 - \zeta^2} \quad \text{Eq. 2}$$

$$B = \frac{1}{\omega_d} \zeta \omega_0 \frac{-G i_0}{k} \quad \text{Eq. 3}$$

$$A = \frac{-G i_0}{k} \quad \text{Eq. 4}$$

G is the voltage sensitivity, ω_0 is the natural frequency of the system, i_0 is the input current, ζ is the damping ratio, k is the spring constant, m is the mass, and t is the time.