

Seismic Model

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1 Seismic Model

1.1 Damped Oscillator

1.1.1 Equations

Kelvin Voight Model from [1]. $x(t)$ is the displacement function(measured), σ is stress, ϵ is strain

$$F = f_e + f_v = kx + k' \frac{\partial x}{\partial t} \quad (1)$$

$$\frac{d^2 x}{dt^2} = -k_p \frac{dx}{dt} - kx + F \quad (2)$$

$$\sigma = \sigma_1 + \sigma_2 = \mu\epsilon + \eta\dot{\epsilon} \quad (3)$$

$$\epsilon(t) = \epsilon(0)e^{-t/t_0} + \frac{1}{\eta} \int_0^t \sigma(\theta)e^{-(t-\theta)/t_0} d\theta \quad (4)$$

References

- [1] Ari Ben-Menahem and Sarva Jit Singh. *Seismic waves and sources*. Springer Science & Business Media, 2012.