Seismic Model

Max Fisch, Justin Turcotte

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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

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

$$\frac{dx}{dt} = \frac{1}{k'}\left(-kx + F\right) \tag{2}$$

$$\sigma = \sigma_1 + \sigma_2 = \mu\epsilon + \eta\dot{\epsilon} \tag{3}$$

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

References

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