1 Simple Harmonic Oscillator

A simple harmonic oscillator has the equation of motion

$$m\frac{\mathrm{d}^2x}{\mathrm{d}t^2} + kx = 0 \tag{1.1}$$

where m and k are physical constants, x is the dependent dynamical variable (position), and t is the independent variable commonly called time. Introduce the change of (independent) variable from t to τ with

$$\tau = \omega_0 t \tag{1.2}$$

where $\omega_0^2 = \frac{k}{m}$. What is the minimum number of parameters that are needed to described this scaled version of this simple harmonic oscillator system.