Consider the following linear harmonic oscillator with nonlinear damping

$$\ddot{x} + x = -\varepsilon [a_1 \dot{x} + a_2 (\dot{x})^{\frac{1}{3}}], \quad x(0) = A, \quad \dot{x}(0) = 0,$$

where the parameter $\varepsilon$ satisfies, $0 < \varepsilon \ll 1$, and $a_1$ and $a_2$ are non-negative; and the initial state has amplitude $A$, with zero velocity. We use the method of first-order averaging to calculate an approximation to the oscillatory solution and show, by means of the explicit solution, that the amplitude of the damped oscillations go to zero in a finite time. This result holds true if the nonlinear damping term is replaced by $|\text{sgn}(\dot{x})| |\dot{x}|^\alpha$, where $0 < \alpha < 1$. (Received August 15, 2012)