1086-34-278 **Tre Wells*** (`tre-wells@yahoo.com`), Morehouse College, Atlanta, GA 30314, and **Ronald E Mickens** (`rmickens@cau.edu`), Clark Atlanta University, Atlanta, GA 30314. *An Exact Solution to the Linear Plus One-third Amplitude Damping Problem.*

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 ε 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 $[\mathrm{sgn}(\dot{x})]|\dot{x}|^{\alpha}$, where $0 < \alpha < 1$. (Received August 15, 2012)