1035-34-387 **Ronald E Mickens*** (`rohrs@math.gatech.edu`), Clark Atlanta University, Box 1744 - Department of Physics, Atlanta, GA 30314. *Preliminary Results on Two New Oscillatory Functions: Lcn(t) and Lsn(t).* Preliminary report.

The differential equation $\ddot{x} + x^{1/3} = 0$ where $(\cdot) \equiv d/dt$, is an explicit example of a new class of nonlinear oscillator equation characterized by elastic forces depending on rational powers of the dependent variable [1]. We demonstrate, using two-dim phase-space techniques, that all solutions are periodic and calculate the exact period of the oscillations. In analogy to the solutions of the ODE, $\ddot{x} + x^3 = 0$, for which the solutions include the Jacobi "cosine" and "sine" elliptic functions [2], we define solutions $Lcn(t)$ and $Lsn(t)$ corresponding, respectively, to the initial conditions: $x(0) = 1$, $\dot{x}(0) = 0$ and $x(0) = 0$, $\dot{x}(0) = 1$. Several properties of these new functions are established.

References

[1] R. E. Mickens, *Journal of Sound and Vibration* **292** (2006), 964–968.

[2] R. E. Mickens, *Oscillations in Planar Dynamic Systems* (World Scientific, Singapore, 1996). (Received September 05, 2007)