1096-34-1031 **Tre Wells***, Morehouse College, Atlanta, GA 30314, and **Ronald E. Mickens**, Department of Physics, Clark Atlanta University, Atlanta, GA 30314. *Singularity Structure of the Leah-Sine Function, Lsn(t), at t = 0.*

The Leah-sine function [1] is the solution to the following initial-value problem

$$\frac{d^2x(t)}{dt^2} + x(t)^{\frac{1}{3}} = 0, \qquad x(0) = 0, \quad \frac{dx(0)}{dt} = 1. \tag{*}$$

This solution does not have a Taylor series at $t = 0$ since all the derivatives, of order greater than the second, are not defined at t=0, i.e., they are unbounded. Using the method of dominant balance [2], we present arguments which show that $Lsn(t)$ has the following (asymptotic) structure

$$Lsn(t) \sim \left[t + d_1 t^{\frac{7}{3}} + d_2 t^{\frac{11}{3}}\right] f(t^4). \tag{**}$$

References

[1] J. Mann and R.E. Mickens, Abstracts of papers presented to the American Mathematical Society, vol.33 (#1, Issue 167, Winter 2012), Abstract 1077-35-2144, pp.171.

[2] C.M. Bender and S.A. Oeszag, Advanced Mathematical Methods for Scientists and Engineers (McGraw-Hill, New York, 1978); see pps. 83-88. (Received September 12, 2013)