1106-VL-2587 **'Kale Oyedeji*** (`kale.oyedeji@morehouse.edu`), Dept of Physics, Morehouse College, Atlanta, GA 30314-3773, and **Ronald E. Mickens**. *Numerical Determination of the Fourier Coefficients for the Leah-Cosine Function.*

The Leah-cosine function, $Lcn(t)$, is the solution to the initial-value problem

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

This nonlinear ODE has the first-intergral

$$y^2 + \frac{3}{2}x^{\frac{4}{3}} = \frac{3}{2}, \qquad y = \frac{dx}{dt}, \tag{}$$

and from it we can reach the following conclusions:

(a) All solutions are periodic.

(b) The exact value of the period, T, can be calculated and is expressible in terms of gamma functions.

(c) The Leah-cosine function has the same general properties as those exhibited by the standard trigonometric cosine function.

(d) $Lcn(t)$ has the Fourier representation

$$Lcn(t) = \sum_{k=0}^{\infty} a_k \cos(2k+1)\left(\frac{2\pi}{T}\right)t$$

In this presentation, we present our numerical estimates for the Fourier coefficients, (a_k), and derive many of the features stated above. (Received September 16, 2014)