1067-34-92 **Joshua Mann***, Morehouse College, Atlanta, GA 30314, **Anthony Scrouse**, Morehouse College, Atlanta, GA 30314, and **Ronald E. Mickens**, Clark Atlanta University, Atlanta, GA 30314.

Preliminary Investigation on the Properties of the "Leah"-Cosine and -Sine Functions†.

The fundamental trigonometric functions, sine and cosine, may be defined as solutions of ODE, $\ddot{x} + x = 0$, with specific conditions

$$\cos t : \ddot{x} + x = 0; \quad x(0) = 1, \quad \dot{x}(0) = 0,$$

$$\sin t : \ddot{x} + x = 0; \quad x(0) = 0, \quad \dot{x}(0) = 1.$$

Likewise, special cases of the Jacobi elliptic functions are solutions to the following initial value problems

$$\mathrm{cn}(t) : \ddot{x} + x^3 = 0; \quad x(0) = 1, \quad \dot{x}(0) = 0,$$

$$\mathrm{sn}(t) : \ddot{x} + x^3 = 0; \quad x(0) = 0, \quad \dot{x}(0) = 1.$$

The current work introduces a new pair of functions defined by solutions to the nonlinear differential equations

$$\mathrm{Lcn}(t) : \ddot{x} + x^{1/3} = 0; \quad x(0) = 1, \quad \dot{x}(0) = 0,$$

$$\mathrm{Lsn}(t) : \ddot{x} + x^{1/3} = 0; \quad x(0) = 0, \quad \dot{x}(0) = 1.$$

We designate these solutions, respectively, the "Leah-cosine" (Lcn) and "Leah-sine" (Lsn) functions. Our presentation will discuss some of their elementary properties and list several open issues related to obtaining a fuller understanding of these functions.

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