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Properties of the Leah-Cosine (Lcn) Function.

The Leah-cosine (Lcn) function is defined to be the solution to the following initial-value problem:

$$\ddot{x} + x^{\frac{1}{3}} = 0; \quad x(0) = 1, \quad \dot{x}(0) = 0.$$

Using phase-space and related techniques, we calculate the exact period (T) in terms of the Beta function, and also determine the area of the closed phase-space trajectories. We also derive the first terms of the Taylor expansion and provide arguments which show that this series converges in $(-\frac{T}{4}, \frac{T}{4})$. Finally, using the concepts of "cosine- and sine-like functions", an associated Leah-sine function is defined, along with a number of functional relations connecting quadratic powers of Lcn and Lsn to linear powers, but with altered arguments in their independent variables. (Received August 15, 2012)