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Dynamics of the Hamiltonian $H(x,y) = |x| + |y|$ KALE OYEDEJI, Morehouse Coll, RONALD E. MICKENS, Clark Atlanta University — We investigate the classical dynamics of the Hamiltonian (1) $H(x, y) = |x| + |y|$, and normalize the energy value to be $H(x, y) = 1$. The equations of motion are (2) $\frac{dx}{dt} = \frac{\partial H}{\partial y} = sgn(y)$, $\frac{dy}{dt} = -\frac{\partial H}{\partial x} = -sgn(x)$. In addition to proving all solutions are periodic, we also calculate explicitly the exact analytical solutions to Eq. (2). Further, we show that $x(t)$ and $y(t)$ have many features in common with the standard trigonometric cosine and sine functions. The work is based on the previous results of Mickens [1]. Reference [1] R.E. Mickens, “Some properties of square (periodic) functions”. Proceedings of Dynamic Systems and Applications 7 (2016), 282-286.

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