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Comments on a Particular Class of Generalized Trigonometric Functions 'KALE OYEDEJI, Morehouse College, RONALD E. MICKENS, Clark Atlanta University — The standard trigonometric functions, cos(x) and sin(x), satisfy the relation $(\sin x)^2+(\cos x)^2 =1$. The pair of generalized trigonometric functions, cos(p,q,x) and sin(p,q,x), are defined such that they satisfy the condition

$$[\sin(p,q,x)]^2 + [\cos(p,q,x)]^2 = 1, \tag{1}$$

with the requirements

$$\cos(p,q,x) = -(d/(dx))\sin(p,q,x), \tag{2}$$

$$p = ((2n)/(2m+1))q = ((2k)/(2l+1)) \tag{3}$$

where (n,m,k,l) are non-negative integers and, m<n and l<k. These functions are a subclass of those presented in the book by J. Lang and D. Edmunds (Eigenvalues, Embeddings and Generalized Trigonometric Functions, Springer 2011). We discuss several of the mathematical properties of these functions and indicate their relevance for determining solutions to the systems modeled by nonlinear oscillators. Note that while the solutions and their first-derivatives exist, second- and higher-order derivatives may become singular for particular values of x.

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