1009-33-121 **Martin E Muldoon*** (muldoon@yorku.ca), Department of Mathematics and Statistics, York University, Toronto, Ontario M3J 1P3, Canada. *Continuous ranking of zeros of special functions.* Preliminary report.

Á. Elbert and A. Laforgia, *SIAM J. Math. Anal.* **15** (1984), 206–212, described a way in which the zeros of cylinder functions $\mathcal{C}_\nu(x) = \cos\alpha J_\nu(x) - \sin\alpha Y_\nu(x)$ may be defined as functions of two variables ν and κ, where κ is a kind of generalized rank. Specifically, when $\nu > -1$, the k th positive zero $c(\nu, k, \alpha)$ of $\mathcal{C}_\nu(x)$ has the property that the variables α and k are not really independent but may be subsumed in the single variable $\kappa = k - \alpha/\pi$. Following Elbert and Laforgia, we write $j_{\nu\kappa} = c(\nu, k, \alpha)$. For integer values of κ, $j_{\nu\kappa}$ gives the zeros of $J_\nu(x)$ while the values $\kappa = k + \frac{1}{2}$ give the zeros of $Y_\nu(x)$. Here we extend this set of ideas to solutions of a general class of differential equations by showing that the notion of continuous rank of a zero follows naturally from the notion of "first phase" as described in the work of O. Borůvka. This enables us to derive a number of results on monotonicity properties of zeros of Bessel and Hermite functions. (Received August 10, 2005)