1067-35-2048   **Vincent J van Joolen*** (`vanjoole@usna.edu`), 219 Holland Rd, Severna Park, MD 21146. *A Round Peg in a Square Hole? Application of Non-uniform Rectangular Grid Schemes to Circular Domains.*

One might deem the use of rectangular finite difference schemes on circular domains as an oxymoron, or quite literally, "forcing a round peg into a square hole". However, recently developed equations for non-uniform rectangular grids can be effectively applied to a variety of non-rectangular domains. This paper presents the development of these equations and numerically demonstrates their use to approximate the behavior of a classical wave equation on a circle with Dirichlet boundary conditions. Numerical solutions are compared to analytic Bessel series solutions. Improvements to numerical solutions are explored by modifying grid-schemes. (Received September 22, 2010)