Abstract Submitted
for the SES10 Meeting of
The American Physical Society

Polar Representations of Solutions to Nonlinear Oscillator Differential Equations RONALD E. MICKENS, Clark Atlanta University — A fundamental issue in the theory of nonlinear oscillations is how to construct valid analytical approximations for the oscillatory solutions of the associated second-order differential equations. If such equations have a harmonic oscillator limiting form, then, in general, these equations may be reformulated such that a small parameter can be created and the standard perturbation methods can then be applied to determine approximations to the required solutions. Other "global" methods, e.g., harmonic balance, can also be used to obtain estimates for periodic solutions. Our purpose in this presentation is to construct a new technique which may then be used to calculate approximations to the oscillatory solutions of nonlinear oscillatory systems. This method begins with an exact polar mathematical representation for the solution. These equations are then converted to an iteration scheme which can be used to determine approximate solutions to the original problem. An advantage of this procedure is that all of the iterations may be solved (at least to first-order in the iteration variable) exactly.

Kale Oyedeji
Morehouse College

Date submitted: 19 Jul 2010 Electronic form version 1.4