

1100-39-169

Ronald E. Mickens*, Clark Atlanta University, , Atlanta, GA 30314. *Genesis of NSFD Schemes.*

We provide a historical overview of the genesis of the NSFD discretization methodology and how its two fundamental “rules” were derived from the “experimental mathematics” studies by R.E. Mickens. We then demonstrate the application of this technique by means of examples from a broad range of topics in the natural and engineering sciences. In particular, we show how to determine the denominator functions and the discrete structures of nonlinear terms for several special classes of ODE’s and PDE’s. We also discuss the “physical” interpretations of the NSFD methodology and contrast them to the “mathematical” foundations used in the standard analysis of numerical techniques. Some unresolved issues and problems will also be discussed.

References

1) R.E. Mickens, *Nonstandard Finite Difference Models of Differential Equations* (World Scientific, Singapore, 1994). (Received February 07, 2014)