

ON TWO STEP SIMULATION MODELS FOR THE NUMERICAL SOLUTION OF SOME SECOND ORDER ORDINARY DIFFERENTIAL EQUATIONS

¹Obayomi, A.A., ²Oke, M.O., ³Adetolaju, O.S. and ⁴Adenipekun, A.E.

^{1,2}Department of Mathematics, Ekiti State University, Ado – Ekiti, NIGERIA

³Department of Computer Science, Ekiti State University, Ado – Ekiti, NIGERIA

⁴Department of Statistics, Federal Polytechnic, Ede, Osun State, NIGERIA

ABSTRACT

This work presents a new set of two step finite difference schemes for the numerical solution of some second order ordinary differential equations using self-compensating exponential interpolation functions. The differential equations were subjected to some non-standard transformations and were combined with some interpolating functions. The technique produced new simulation models that can be used for the simulation of the dynamics of physical phenomena whose state equations can be represented by second order ordinary differential equations. The resulting schemes have been applied to some second order initial value problems and the results have been found to be suitable.

Keywords: Self-compensating exponential function, Non-standard method, Hybrid method, Interpolation function, Non-standard modeling rules, Standard finite difference method.