

A STUDY OF NUMERICAL METHODS IN
SOLVING INITIAL VALUE PROBLEMS

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It is well known that a wide variety of applications lead to differential equations out of which only a few can be solved analytically. Hence solving differential equations is a very important and vast area in Numerical Analysis. We focused our attention here only on initial value problems. Our objective is to test the algorithms available on the computer.

In the process we examined several singlestep methods such as Picard's, Euler's, Wilson's, Second order Runge-Kutta, Fourth order Runge-Kutta and Kutta-Merson. We also tested some multistep methods such as Adam's-Bashforth and Milne's method. We solved three initial value problems using each algorithm and analysed the error in each case, checking the behaviour of absolute error.

As expected fourth order Runge-Kutta and Kutta-Merson processes produced best results in singlestep methods. However, the results were not straight forward for multistep methods. The efficiency of the method is questionable when it requires more iterations to produce a better answer with less error. When we take these factors into account, Adam's-Bashforth seems to be better than the Milne's method.