1171-65-79 **Laurent O. Jay*** (laurent-jay@uiowa.edu), Department of Mathematics, 14 MacLean Hall, The University of Iowa, Iowa City, IA 52242. *Efficient predictor algorithms of implicit methods for initial value problems.*

We consider the efficient implementation of implicit methods applied with constant step sizes to initial value problems. The use of constant step sizes has several advantages: practical global error estimation, possibility of extrapolation to increase accuracy, theoretical backward error analysis/modified equations results, and no need for practical local 'error estimates'. The main drawback of using constant step sizes is of course its possible inefficiency. Nevertheless, application of constant step sizes after time-rescaling of the differential equations is a way to allow for variable step sizes in the original time in order to regain efficiency. In this talk we present a new predictor algorithm for an efficient implementation of implicit methods applied with constant step sizes. This general acceleration technique is flexible, embarrassingly parallel, and does not require any additional function evaluations. It can drastically reduce the number of function evaluations needed in the modified Newton/fixed point iterations process making implicit methods extremely efficient at the cost of some extra memory usage, thus illustrating the well-known computer science principle of time-memory trade-off. (Received August 08, 2021)