Exponentially fitted explicit hybrid method for solving special second order initial value problems

ABSTRACT

The aim of the research is to improve the existing Hybrid method, so that it is more efficient in solving special second order ordinary differential equations of the form yò=f(x,y),y(x0)=y0,yN(x0)=yN0 which has solutions which are periodic or oscillating. Based on the existing Hybrid method derived by Chawla we constructed the exponentially fitted hybrid method using the technique introduced by Simos and Vigo-Aguiar, resulting in an exponentially fitted hybrid method. The method can be used to solve special second order ordinary differential equations which have oscillating solutions. Numerical experiments based on the exponentially fitted hybrid method and the non exponentially fitted method are tabulated and compared in terms of accuracy, which clearly shown that the exponentially fitted method is more accurate.

Keyword: Exponentially fitted; Hybrid method; Ordinary differential equations; Special second order