

Phase fitted and amplification fitted hybrid methods for solving second-order ordinary differential equations

Abstract

Two fifth-order explicit hybrid methods are developed. Based on these methods, phase fitted and amplification fitted methods are constructed by vanishing both the phase-lag and the dissipation error. For the phase fitted and amplification fitted methods, computation of the output stage is dependent on the frequency of the problem being solved, thus the methods can only be applied when the frequency is known in advance. Numerical comparisons that have been carried out show the advantage of the new methods for solving several second-order ordinary differential equations with oscillating solutions.

Keyword: Hybrid methods; Second-order ordinary differential equations; Zero dissipation error; Zero phase-lag