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NEW COMPUTATIONAL METHOD FOR SOLVING ORDINARY DIFFERENTIAL EQUATIONS

(Kaedah Pengiraan Baharu bagi Menyelesaikan Persamaan Pembezaan Biasa)

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ABSTRACT

In this paper we present a developed couple block method for solving first order ordinary differential equations (ODEs). The coupled block method consists of two proposed block methods i.e the two point two step block method of order five and three point two step block method of order six. Therefore, these methods will estimate the numerical solutions at two and three points simultaneously within a block. The proposed block method is derived using Lagrange interpolation polynomial and is presented as in the simple form of the Adams Moulton type. The developed code is implemented using variable step size and order. The stability of the methods is also studied. Numerical results are presented to compare the performance of the developed code to the existence block method.

Keywords: Block method; variable step size and order; ordinary differential equations

ABSTRAK

Dalam makalah ini dikemukan suatu kaedah blok gandingan yang telah dibangunkan untuk menyelesaikan persamaan pembezaan biasa peringkat pertama. Kaedah blok gandingan terdiri daripada dua kaedah blok yang dicadangkan, iaitu kaedah blok dua titik dua langkah peringkat lima dan kaedah blok tiga titik dua langkah peringkat enam. Oleh itu, kaedah ini akan menghampiri penyelesaian berangka pada dua dan tiga titik secara serentak dalam blok. Kaedah blok yang dicadangkan telah diterbitkan dengan menggunakan interpolasi polinomial Lagrange dan dipersembahkan dari jenis Adams Moulton yang ringkas. Kod yang dibangunkan telah dilaksanakan menggunakan panjang langkah dan peringkat yang berubah. Kestabilan kaedah ini juga dikaji. Hasil berangka diberikan untuk membandingkan prestasi kod yang dibangunkan dengan kaedah blok yang sedia ada.

Kata kunci: Kaedah blok; panjang langkah dan peringkat yang berubah; persamaan pembezaan biasa

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