

SOLVING NONLINEAR TWO POINT BOUNDARY VALUE PROBLEM USING TWO STEP DIRECT METHOD

(Menyelesaikan Masalah Nilai Sempadan Dua Titik Tak Linear Menggunakan
Kaedah Langsung Dua Langkah)

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ABSTRACT

In this paper, we present two step direct method of Adams Moulton type (2PDAM4 and 2PDAM5) for solving nonlinear two point boundary value problems (BVPs) directly. The two step direct method will be utilised to obtain a series solution of the initial value problems at two steps simultaneously. These methods will solve the nonlinear second order BVPs by shooting technique using constant step size. Three step iterative method is considered as a procedure for solving the nonlinear equations and the convergence of the shooting technique. Numerical results are given to illustrate the efficiency and performance of the direct method by the shooting technique with root finding via three-step iterative method for solving boundary value problems. The results clearly show that the two step direct method is able to produce good results compared to the existing method.

Keywords: Boundary value problem; direct method; shooting technique

ABSTRAK

Dalam makalah ini, dicadangkan kaedah langsung dua langkah jenis Adams Moulton (2PDAM4 dan 2PDAM5) untuk menyelesaikan masalah nilai sempadan dua titik yang tak linear secara langsung. Kaedah langsung dua langkah digunakan untuk mendapatkan siri penyelesaian bagi masalah nilai awal pada dua titik serentak. Kaedah ini akan menyelesaikan masalah nilai sempadan peringkat kedua tak linear melalui teknik penembakan dengan menggunakan saiz langkah malar. Kaedah lelaran tiga langkah diambil kira sebagai suatu prosedur untuk menyelesaikan persamaan tak linear dan penumpuan teknik penembakan. Hasil berangka diberi untuk menggambarkan kecekapan dan prestasi kaedah langsung yang dicadangkan dengan teknik penembakan melalui kaedah lelaran tiga langkah untuk menyelesaikan masalah nilai sempadan. Keputusan jelas menunjukkan bahawa kaedah langsung dua langkah mampu menghasilkan keputusan yang baik berbanding dengan kaedah yang sedia ada.

Kata kunci: Masalah nilai sempadan; kaedah langsung; teknik penembakan

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