بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــســـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

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بالرسالة صفحات

لم ترد بالأصـــل

Ain Shams University
Faculty of Science
Mathematics Department

On the Efficiency and Accuracy of Numerical Solutions of Particular Differential Equations

Thesis
Submitted for the Degree of Doctor of Philosophy for Science in Pure Mathematics (Numerical Analysis)

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ABSTRACT

Fatma Abd El-Rahman Ahmed Zaid. On the Efficiency and Accuracy of Numerical Solutions of Particular Differential Equations. Submitted for the Degree of Doctor of Philosophy in Science in Pure Mathematics (Numerical Analysis). Ain Shams University, 1999.

The main purpose of this thesis is to find a generalization for Harten's theorem for total variation non-increasing methods in the case of five, seven up to 2m+1 points for non zero integer m. Also, we present a general form of two-level and 2m-order in space and time explicit finite difference scheme with 2m+1-point for hyperbolic conservation laws. The form of this method is suitable for calculating the flux limiter technique for accuracy up to 2m-order. Also it will obtain the high resolution, total variation non increasing oscillations free of fourth, sixth and eighth order accurate explicit methods in space and time by adding suitable number of limiters of antidiffusive flux to a first order scheme. By the same way we shall treat the oscillations in the second and fourth order accurate implicit methods in the space and time. And the right oscillations are treated of these methods by adding inverse limiters for the limiters which we are adding to treat the left oscillations. The CFL condition is still satisfied. Also it presents the modification scheme for these methods to give high accuracy in the region of the discontinuities.

Key words: hyperbolic conservation laws, weak solutions, Riemann's problem entropy condition, monotone numerical methods, high resolution methods, flux limiter methods.

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