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شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

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بالرسالة صفحات
لم ترد بالأصل

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)

By

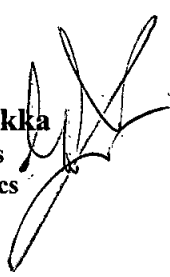
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$\Delta f_{\text{eff}}^{\text{eff}} = \frac{f_0}{Q} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{f_0}{Q}$

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1. The first part of the paper discusses the importance of the study of the history of the United States. It is argued that a knowledge of the past is essential for a full understanding of the present and for the development of a sound policy for the future. The author points out that the study of history is not only a means of satisfying our curiosity about the past, but also a means of training the mind and of developing the character. He concludes that the study of history is one of the most important and most useful of all the studies that a student can pursue.

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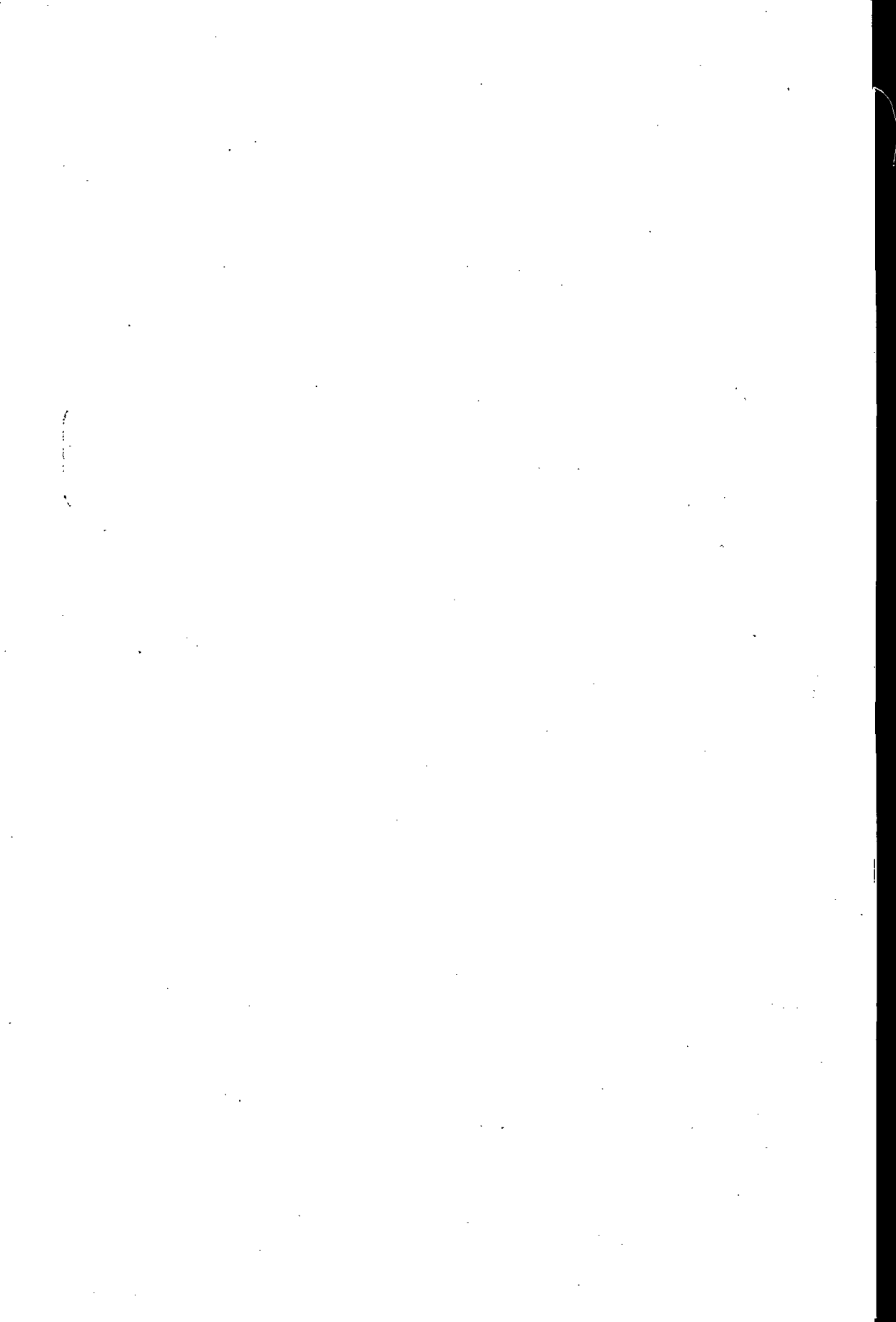
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ABSTRACT

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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