

Book Review

A. R. Mitchell: **Computational Methods in Partial Differential Equations**. John Wiley and Sons, New York, 1969. 256 pages, 45 sh (paper), 80 sh (cloth).

The strength of this book is that it gives a very complete survey of the various methods available for numerically solving partial differential equations by way of finite difference techniques. The author mentions in his preface: "Most of the book is aimed at science and engineering students in the second and third years of their undergraduate studies". Reviewer thinks that there are only very few, if any, universities where students after their third undergraduate year are really master of the various methods given in this book. Notwithstanding this, it is certainly true that the person who has some experience in numerically solving partial differential equations can use this work as a reference text and probably will find some new ideas in it.

As a compilation of methods, the emphasis is more on how to do things than on why. The concepts of consistency, convergence and stability are only casually dealt with (although of course a stability analysis is presented for most of the methods). The truncation error is defined as the omitted terms in the expression for the unknown function at time $t + \Delta t$ and not as the difference between the differential operator and the difference operator. This makes that consistency is not identical to a vanishing truncation error but to a truncation error vanishing as some power of Δt . In connection with the Lax-Wendroff method the conservation form of differential equations is mentioned but no definition of conservation form is given. It is not mentioned that the Lax-Wendroff method introduces artificial viscosity, although there is a chapter on aerodynamic problems. There are also a number of minor inaccuracies in the book.

The final conclusion of this reviewer is that the book is valuable for those working in the field but when used as a textbook the teacher should add basic information.

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