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Título: Exact And Truncated Difference Schemes For Boundary Value Odes (Vol. 159)

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Sinopsis

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The book provides a comprehensive introduction to compact finite difference methods for solving boundary value ODEs with high accuracy. The corresponding theory is based on exact difference schemes (EDS) from which the implementable truncated difference schemes (TDS) are derived. The TDS are now competitive in terms of efficiency and accuracy with the well-studied numerical algorithms for the solution of initial value ODEs. Moreover, various a posteriori error estimators are presented which can be used in adaptive algorithms as important building blocks. The new class of EDS and TDS treated in this book can be considered as further developments of the results presented in the highly respected books of the Russian mathematician A. A. Samarskii. It is shown that the new Samarskii-like techniques open the horizon for the numerical treatment of more complicated problems.

The book contains exercises and the corresponding solutions enabling the use as a course text or for self-study. Researchers and students from numerical methods, engineering and other sciences will find this book provides an accessible and self-contained introduction to numerical methods for solving boundary value ODEs.