



Method of Lines Analysis of Turing Models

By William E Schiesser

World Scientific Publishing Company. Hardcover. Condition: New. 268 pages. Dimensions: 9.4in. x 6.2in. x 0.8in. This book is directed toward the numerical integration (solution) of a system of partial differential equations (PDEs) that describes a combination of chemical reaction and diffusion, that is, reaction-diffusion PDEs. The particular form of the PDEs corresponds to a system discussed by Alan Turing and is therefore termed a Turing model. Specifically, Turing considered how a reaction-diffusion system can be formulated that does not have the usual smoothing properties of a diffusion (dispersion) system, and can, in fact, develop a spatial variation that might be interpreted as a form of morphogenesis, so he termed the chemicals as morphogens. Turing alluded to the important impact computers would have in the study of a morphogenic PDE system, but at the time (1952), computers were still not readily available. Therefore, his paper is based on analytical methods. Although computers have since been applied to Turing models, computer-based analysis is still not facilitated by a discussion of numerical algorithms and a readily available system of computer routines. The intent of this book is to provide a basic discussion of numerical methods and associated computer routines for reaction-diffusion systems of varying...



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