Numerical Solution of Partial Differential Equations
D-46-1
Fall 1996
Hermann Riecke

Outline

1. Preliminaries
2. Classification and Some Properties of PDEs
3. Difference Approximations of Derivatives
4. Temporal Errors: Continuous-Time Approximation
5. Difference Schemes in Space and Time
6. General Formulation of Difference Schemes
7. More Schemes
8. Initial-Boundary-Value Problems
9. Difference Approximations and Boundary-Value Problems
10. Examples of Boundary Conditions
11. Two-dimensional Problems
12. Second-Order Equations
13. Special Topics

Assignments

There will be a few smaller assignments and two larger projects. They have to be handed in at the respective due dates. For programming and computation you are asked to obtain an account on the HP workstation lab. Application forms are available in Vogelback.

Programming Languages

In the scientific community only FORTRAN and C are used for computations. Therefore the projects should be done using either of these languages. For certain parts you will be asked to use MATLAB. I will give a brief introduction into MATLAB.

Sample Programs

In order to send you sample programs I will need your e-mail addresses. Therefore please send me a brief message (to h-riecke@nwu.edu) from the account at which you would like to receive those samples.

Newsgroup

To enhance the communication among the students I have set up a newsgroup for this class. Please make use of it and post questions if you have a question regarding class, find strange behavior in your code, don't understand what's to be done in the project, ... But also: share the information if you found something you expect other people to have trouble with or something other people would find interesting. I will also read the newsgroup regularly and will throw in some comments and answer questions as needed. The newsgroup can be reached *via* the ESAM web page *www.esam.nwu.edu* or *via* the electronic reserve system *www.library.nwu.edu/ERS*.
Remember: if nobody responds to a question, nobody will be able to get an answer.

Office Hours: Mo 5.15-6.15, Tu 5-6, Th 5-6 #3814.