Ciclo di lezioni per il
CORSO DI DOTTORATO IN FISICA

Prof. Martin Hasenbusch

"Advanced Numerical Methods in Theoretical Physics"

da Lunedi 5 giugno 2006 - ore 10:30-12:30
Aula S1- Ed. B -Polo Didattico Fibonacci
Le lezioni proseguiranno per un mese con questo orario ogni
lunedi e giovedi

Programma:
- Properties of floating point arithmetics
- Basic properties of modern computers
- Root finding
- Interpolation and Extrapolation,
Polynomial, Rational, spline interpolation
- integration methods
- Ordinary differential equations
Runge-Kutta method; Richardson extrapolation;
stability; molecular dynamics.
- Partial differential equations, systems of linear equations with
with sparse matrices, Krylov-space methods, Multigrid, domain
decomposition. Eigenvalues and Eigenvectors.
Physics problems: diffusion, wave and Poisson equations,
QCD fermion determinant.
One aim of the lecture is to learn the use of numerical libraries
such as the LAPACK library for linear algebra problems or the
gsl (GNU scientific library).
Whenever possible, the numerical methods are discussed at the example of
physics problems.
        Requirements:
The student should have same basic knowledge in Fortran77 or C