ICTP DIPLOMA PROGRAMME IN MATHEMATICS 2017-18

Partial Differential Equations

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Linear transport equation with constant coefficients: homogeneous and non homogeneous case. The system of characteristics.
The linear wave equation in one space dimension.
Examples of superpositions of solutions.
General linear first order PDEs. Quasilinear first order partial differential equations. The bicharacteristic system for Hamilton-Jacobi equations.
Subharmonic and harmonic functions. Relations with holomorphic functions in the complex plane. The fundamental solution. Representation theorems.
Surface mean value formula, and surface mean value inequality.
Volume mean value formula. Inversion with respect to a sphere.
Poisson kernel for the ball.
Solution of the Dirichlet problem on the ball with continuous boundary condition.