Title: Complex analysis

Basic Details:
- Core Audience: First year, pure and applied
- Course Format: Extended (10 hours at 2 hours per week)

Course Description:
- Keywords: Nevanlinna theory, monodromy, Riemann-Hilbert problems, elliptic functions, hypergeometric functions, Painlevé equations.
- Syllabus:
  Approximate breakdown by hour:

  Part I: The value distribution of meromorphic functions (Nevanlinna theory)
  2. Basic identities and properties of the characteristic function.
  5. Defect relations. Discussion of Vojta’s dictionary and connections with Diophantine approximation (additional handouts will be available for students interested in this topic).

  Part II: Special functions in the complex domain
  8. The monodromy group. Monodromy for the hypergeometric equation.

Recommended reading:
- W. Cherry and Z. Ye, Nevanlinna’s theory of value distribution, Springer, 2001
- E. L. Ince, Ordinary differential equations, Dover, 1956

Additional Optional reading:
- E. Bombieri and W. Gubler, Heights in Diophantine geometry, CUP, 2006
- F. D. Gakhov, Boundary value problems, Pergamon Press, 1966
- A. A. Goldberg and I. V. Ostrovskii, Value distribution of meromorphic functions, AMS, 2008
- E. Hille, Ordinary differential equations in the complex domain, Wiley, 1976
- N. I. Muskhelishvili, Singular integral equations, 1953

Prerequisites: Any standard introductory course on complex analysis.
• Format:
  - No of discussion/problem sheets: 4
  - Electronic lecture notes: Yes.
  - Necessary support facilities: None
  - Necessary software requirements for computing facilities: None
  - Proposed timing: Spring
  - Lecture/computer session/tutorial/discussion split (hours of each): 10 hours of lectures

• Lecturer Details:
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