COMPLEX ANALYSIS

Course Content

July 22-August 16, 2024-SMI Summer School Perugia

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Textbook: Theodore Gamelin, "Complex Analysis", Springer

Program: Chapter II-IX
Remark: The course is completely self-contained and presumes no previous knowledge of complex analysis.

Further indication for suggested reading before the course: Reviewing basic knowledge about one and two real variable calculus. We will use tools from calculus such as integration on curves, sequences and infinite sums and ra- dius of convergence of power series.

More detailed (tentative) program

1. Elementary Properties of Analytic Functions

2. Complex Differentiation

3. Integration over Paths and Cauchy Integral Formula

4. Power Series Representation

5. Liouville's and Morera's Theorem

6. Zeroes of Holomorphic Functions and Analytic Continuation

7. The Maximum Modulus Principle

8. Laurent Series

9. Isolated Singularities

10. The Residue Theorem

11. The Argument Principle

12. Rouché's Theorem

13. The Open mapping and Inverse Function Theorems

14. Winding Numbers

15. The Schwartz lemma and the Automorphisms of the Unit Disk

16. Automorphisms of the Complex Plane and Complex Tori

17. Regular functions on domains of the quaternions $\mathbb{H}$