Math116: Complex Analysis

MoWeFr 9:30 – 10:20am at 380X

Instructor: Yakov Eliashberg

1. Complex Analysis Basics

9/23-9/27 Complex numbers from the real perspective. *OT: Chapter1; SS: 1.1*

- Holomorphic functions, \( \bar{\partial} \)-operator and Cauchy-Riemann equations *OT: Chapter2; SS: 1.2.1,1.2.2*
- Recollection of differential 1-forms and their integration *OT: Chapter 3*

9/30-10/5 Cauchy theorem and its corollaries. Cauchy integral formula *OT: chapter 4; SS: 2.1,2.2, 2.4*

- Converging power series. Exponential, trigonometric functions and logarithm *OT: Chapters 5 and 6; SS 1.2*
- Equivalence of analytic and holomorphic functions. *OT: Chapter 5; SS: 2.4*

10/8-10/12 Zeroes and poles. Classification of singularities. Meromorphic functions. *OT: Sections 7.1, SS 3.1, 3.3*

- Residues. Computation of contour integrals. *OT: Sections 7.2 SS 3.2*
- Computation of definite integrals. *OT: Sections 7.3, SS 2.3, 3.2.1*
- Riemann sphere. *OT: Sections 7.4, 3.3*

10/15-10/19 Various applications of Cauchy integral formulas. Argument principle and Rouché’s theorem. *OT: Sections 7.5-7.6, SS 3.4*

- Harmonic functions *OT Section 8*

2. Conformal mappings


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\(^1\)OT: Online text; SS: Stein and Shakarchi
10/30 Midterm exam 
11/26-11/30 Elliptic functions. 
12/3-12/7 Subject overview.