

Math 305: Applied Complex Analysis

Textbook

Fundamentals of Complex Analysis with Applications to Engineering and Science (Third Edition), by E. Saff and A. Snider. The text will be supplemented with notes by Michael Ward, available on the course website.

Topics

1. Basic properties of complex numbers, complex exponentials, roots of unity, powers and roots, elementary mappings. (Sections 1.1–1.7)
2. Functions of a Complex Variable: analytic functions, Cauchy-Riemann equations, Harmonic functions, some special functions such trigonometric functions. (Sections 2.1–2.6, 3.1–3.2)
3. Multivalued functions, inverse functions, and branch cuts. The Logarithm function. (Sections 3.3, 3.5, and notes)
4. Contour integration. Cauchy's integral theorem, path independence. (Sections 4.1–4.7)
5. Laurent series, singularities, poles and residue Calculus. (Sections 5.5–5.7, 6.1–6.5)
6. Fourier transform integrals. (Section 8.1, 8.2 and notes)
7. Laplace transform integrals, integrals of multivalued functions, Nyquist criteria and applications. (Section 8.3 and notes)

Grading

The weighting will be: Final 50%, 2 Midterms 20% each, HW 10%. The first midterm is October 10th, and the second midterm is November 7th. There are no make-up midterms. If you miss a midterm for a valid medical reason, the weighting for the final will be adjusted. Other than this, no re-negotiating of the weights of the different components of the overall grade will be considered.

Homework

There will be weekly homework assignments. I will drop the lowest homework score.

Instructor

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