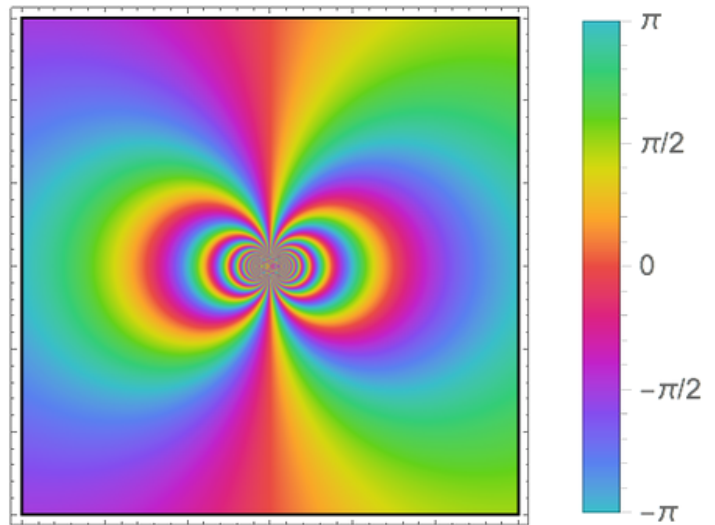


Complex Analysis

Course: MAT 452
Instructor: Matthew Hernandez
Schedule: 9:00 – 9:50 am MWF
References: Visual Complex Analysis
by Tristan Needham
Schaum's Outline of Complex Variables



Topics:

- Geometry of complex arithmetic and Möbius transformations
- Analytic extension of elementary functions to the complex plane
- Complex differentiation, integration, and power series
- Poles, essential singularities, and Laurent series
- Cauchy's formula and the calculus of residues, calculating $\int_0^{\infty} \frac{\sin x}{x} dx = \frac{\pi}{2}$
- Applications to fluid dynamics

Description:

Have you ever wondered why $e^{\pi i} = -1$? Complex analysis takes off with ideas like this, investigating the natural extension of calculus of functions on the real line to that of functions on the complex plane. It is the key to a wide array of topics in pure and applied math, arising in virtually everything from number theory to the physics of fluid flows and signal processing.

To borrow phrases from the course text, "visually accessible arguments" complement "purely symbolic logical reasoning." The goal of this course is to build strong geometric intuition as a foundation for mastering the basic tools of complex analysis.

Prerequisite: MAT 228

