

Course Announcement for Spring 2012

M 564 - Topics in Analysis (3 credits) - Introduction to Several Complex Variables

Instructor: Jennifer Halfpap (halfpap@mso.umt.edu)

Meeting Time: MWF 9:10 - 10:00

The analysis of functions of one complex variable begins by defining a function to be *analytic* at z_0 if

$$\lim_{z \rightarrow z_0} \frac{f(z) - f(z_0)}{z - z_0} \quad (1)$$

exists. Although this definition is clearly analogous to the definition of a differentiable function of a single variable, it is a beautiful and remarkable fact that analytic functions have additional properties; they are infinitely-differentiable, can be expressed as convergent power series, and admit an integral representation via the Cauchy integral formula. Many of these properties stem from the fact that the existence of the limit (1) is equivalent to the condition that f satisfies a system of PDEs called the *Cauchy-Riemann equations*.

The most obvious generalizations of the above ideas are to functions of *several* complex variables. In this course, we will review the central ideas from one-variable complex analysis, and then embark on the more general setting. Topics include the Cauchy integral formula in one and several variables, domains of holomorphy, pseudoconvexity, and the L^2 theory of the Cauchy-Riemann operator.

Intended audience/prerequisites: This is a graduate course in complex analysis intended for students with some familiarity with functions of one complex variable. Come see me if you have questions about your preparation.

Text: I have selected *An Introduction to Complex Analysis in Several Variables*, by Lars Hörmander. We will discuss Chapters 1, 2, and 4.