# Analysis of several complex variables

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## Abstract

Analysis of several complex variables is a necessary pre-requisite to study many important domains of contemporary mathematics such as algebraic geometry, complex dynamics, singularity theory, differential equations etc. While holomorphic functions of several complex variables share many basic properties of functions of one variable, new phenomena of analytic extention occurs. For example, they can have neither isolated singularities, nor compact sets of singularities. The statement of Riemann Mapping Theorem in higher dimensions is strongly false. Namely, generic pair of two simply connected domains in complex space are not biholomorphically equivalent. Each complex space of dimension at least two contains a proper domain that is biholomorphically equivalent to the ambient space (Fatou–Bieberbach domain). Theory of holomorphic convexity and Stein manifolds together with basic sheave theory allows to prove important extension and approximation theorems. For example, each holomorphic function on a submanifold of a linear complex space is the restriction to if of a global holomorphic function on the ambient space. The GAGA principle in algebraic geometry says that every analytic object on a complex projective algebraic manifold is algebraic. The cours will cover the above mentioned topics, including basic analytic set theory, biholomorphic automorphisms and introduction to complex dynamics.