Workshop dedicated to the memory of Professor Gabriela Kohr
Geometric Function Theory in Several Complex Variables and Complex Banach Spaces

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Rigidity of holomorphic mappings and semigroups

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Abstract

There is a long history associated with the problem of iterating nonexpansive and holomorphic mappings and finnding their fixed points. Historically, complex dynamics and geometrical function theory have been intensively developed from the beginning of the twentieth century. They provide the foundations for broad areas of mathematics. In the last fifty years the theory of holomorphic mappings on complex spaces has been studied by many mathematicians with many applications to nonlinear analysis, functional analysis, differential equations, classical and quantum mechanics. The laws of dynamics are usually presented as equations of motion which are written in the abstract form of a dynamical system: $\frac{dx}{dt} + f(x) = 0$, where x is a variable describing the state of the system under study, and f is a vector-function of x. The study of such systems when f is a monotone or an accretive (generally non-linear) operator on the underlying space has recently been the subject of much research by analysts working on quite a variety of interesting topics, including boundary value problems, integral equations and evolution problems. In this talk we give a brief description of the classical statements with their modern interpretations for discrete and continuous semigroups of hyperbolically nonexpansive mappings in Hilbert and Banach spaces. We also present some special recent achivements for the one-dimensional case. This talk mostly based on joint works with M. Elin and T. Sugawa.