**THE UNIVERSITY**     **OF HONG KONG**

*Institute of Mathematical Research*
*Department of Mathematics*

# LECTURE SERIES

# Methods of Rational Curves and Pluricanonical Bundles in Complex Geometry

## Professor Yum-Tong Siu

William Elwood Byerly Professor, Harvard U.

## Abstract

The uniformization theorem of the trichotomy of a simply connected Riemann surface into the sphere, the plane, and the disk has been motivating a great deal of trailblazing research in complex geometry of many variables; for example, the rigidity theory for a compact complex manifold to be biholomorphic to, or mapped by special maps into, symmetric or locally symmetric manifolds. In this lecture, for the direction of generalizing the sphere from one to many variables, we discuss the method of rational curves and, in particular, a new approach to the conjecture of the nonexistence of complex structure for the 6-sphere by deforming the 8-real-parameter family of criss-crossing holomorphic rational curves in the standard almost complex structure defined by the imaginary octonians of unit length. This is analogous to using rational curves to study the nondeformability of irreducible compact Hermitian symmetric manifolds.

For the direction of generalizing the disk from one to many variables, we discuss the method of pluricanonical bundles. In particular, we introduce the pluricanonical Jacobians of compact Riemann surfaces as pluricanonical analogues of Jacobian varieties. We also use the techniques of Nevanlinna theory and Gelfond-Schneider to study the abundance conjecture which concludes the abundance of pluricanonical sections from the abundance of ample-line-bundle-twisted pluricanonical sections.

In the lecture we will start from scratch with the background and motivation for the topics being discussed.

| Lecture 1: | June 22, 2018 (Friday) 3:30 – 4:30pm |
| --- | --- |
| Lecture 2: | June 29, 2018 (Friday) 3:30 – 4:30pm |

## Room 210, Run Run Shaw Bldg., HKU

*All are welcome*