Our Team

Toshiyuki Kobayashi

Research Area: Mathematics

Principal Investigator

My research interests focus on the analysis of "symmetries" in mathematics. Currently I am working on representation theory and a theory of discontinuous groups including the following topics:

① Analysis of minimal representations: Minimal representations are special irreducible representations, which are a building block of linear symmetries. My guiding hypothesis

minimal representations (algebra)

= maximal symmetries (function spaces)

is a driving force for a new theory of global analysis based on non-commutative symmetries of minimal representations.

② Spectral analysis on locally symmetric spaces: For spaces of indefinite metric, intrinsic differential operators (*e.g.*, Laplacian) are not necessarily elliptic. I am working on the construction of discrete spectrum of such operators, and studying its stability under the deformation of geometric structure.

My research achievements include

③ pioneering works on the theory of discontinuous groups for homogeneous spaces beyond the classical Riemannian setting,

④ pioneering works on the theory of discretely decomposable restrictions of representations (discrete symmetry breaking), and

⑤ an original theory of visible actions on complex manifolds, and its systematic and synthetic application to multiplicity-free theorems on both finite and infinite dimensional representations.