Integrated Research of Analytic and Geometric Invariants of Complex Structure

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【Outline of survey】

Analysis constructed based on complex numbers is called complex analysis. Geometry that naturally represents complex analytic structure is called complex geometry. It is the main purpose and a feature of the present research project to carry out the integrated study on those subjects where complex analytic structure plays an essential role in basic analysis, complex geometry, and algebraic geometry. Here, various invariants defined analytically and geometrically by complex analytic structure play important roles. The related area in the present Mathematics is rather broad, and the importance of the study of complex analytic structure existing in those objects of the area is growing more and more: For instance, the Teichmueller space that describes the moduli of compact Riemann surfaces is a famous one, where various analytic and geometric invariants play crucial roles. Furthermore, this moduli theory is applied from the classification of the low dimensional topological spaces to the theoretical physics nowadays, and is an indispensable theory for those researches. The importance of clarifying the relations between these invariants and to approach the essence of the subject has up to now been growing, though the individual studies of those objects have been performed to considerable level. In the present project we will carry out the integrated research of such complex analytic structure and various invariants and provide research means to the surrounding fields in addition.

【Expected results】

Griffiths' conjecture has been a central problem in the theory of holomorphic curves since 1970's. The conjecture for holomorphic curves in the semi-abelian variety was lately solved as the second main theorem by Noguchi-Winkelmann-Yamanoi. This is giving a number of interesting applications, and further progress toward the case of general varieties is expected. There necessarily appear the use of the differential equation and holomorphic foliations in the research of the jet differentials of holomorphic curves, and applications are expected. The DelbarL2 analysis is important in the research of strongly pseudoconvex manifolds. The progress of a more refined research of the geometric invariants on CR-structure and the progress of Fujita conjecture are expected.

【References by the principal researcher】

・Miyajima K., Noguchi, J., et al. (Eds.), Proceedings OKA 100 Conference Kyoto/Nara 2001, Advanced Studies in Pure Mathematics Vol. 42, x+345 pp., Japan Math. Soc., Tokyo, 2004.
・J. Noguchi, J. Winkelmann and K. Yamanoi, The second main theorem for holomorphic curves into semi-abelian varieties, Acta Math. Vol. 188 No. 1 (2002), 129-161.

【Term of project】 FY 2005-2009 | 【Budget allocation】 75,200,000 yen

【Homepage address】 http://www.ms.u-tokyo.ac.jp/~noguchi/