Study on Algebraic Varieties related to moduli spaces and algebraic cycles

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【Outline of survey】

To understand algebraic varieties which are main objects in algebraic geometry,it is an efficient way to classify them. For the invariants to classify them, we have discrete invariants and continuous parameters. In the classification theory of algebraic varieties, firstly we classify them by using discrete invariants and then examine continuous parameters. The classification theory by discrete invariants is going to be constructed in birational geometry by S. Mori, Y. Kawamata, Y. Kollar, etc., and in dimension less than or equal to three we have the classification theory for algebraic varieties in characteristic 0. As for the continuous parameters, in the 1960's, D.Mumford constructed the precise theory of moduli spaces. They often have the structure of algebraic varieties, and become interesting objects to study in algebraic geometry. The main purpose of this research is to study the structures of various moduli spaces, and make them clear.In particular, we are interested in Calabi-Yau varieties which are also used in superstring theory.

【Expected results】

Algebraic geometry is the area to study mainly algebraic varieties. Algebraic variety is a fundamental geometric object which is locally given by common zero points of some polynomials. In our research we study the moduli space. By the study of moduli space we can clarify properties of algebraic varieties. More concretely we will treat moduli spaces of Abelian varieties and of Calabi-Yau varieties. These varieties are used also in physics, and it is very important to study them.

【References by the principal investigator】

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・G.van der Geer and T.Katsura, On a stratification of the moduli of K3 surfaces, J. Eur. Math. Soc., 2 (2000), 259-290.

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