Classifying Spaces of Degenerating Polarized Hodge Structures
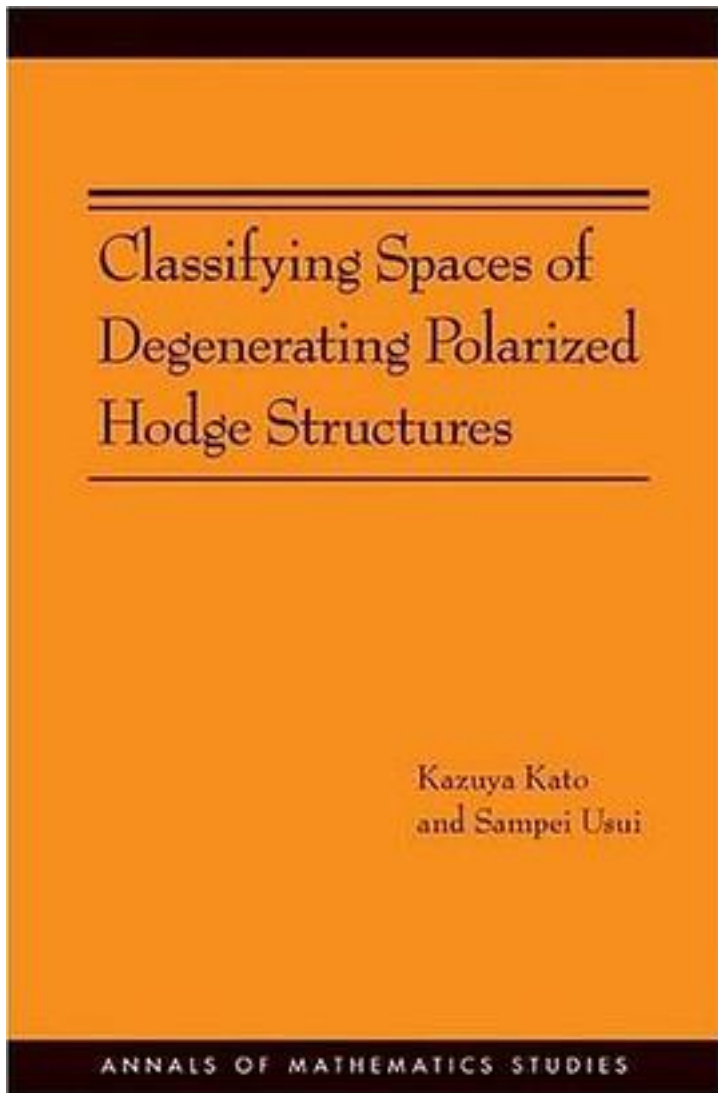
Classifying Spaces of Degenerating Polarized
Hodge Structures

Kazuya Kato
and Sampei Usui

ANNALS OF MATHEMATICS STUDIES

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In 1970, Phillip Griffiths envisioned that points at infinity could be added to the classifying space D of polarized Hodge structures. In this book, Kazuya Kato and Sampei Usui realize this dream by creating a logarithmic Hodge theory. They use the logarithmic structures begun by Fontaine-Illusie to revive nilpotent orbits as a logarithmic Hodge structure. The book focuses on two principal topics. First, Kato and Usui construct the fine moduli space of polarized logarithmic Hodge structures with additional structures. Even for a Hermitian symmetric domain D, the present theory is a refinement of the toroidal compactifications by Mumford et al.For general D, fine moduli spaces may have slits caused by Griffiths transversality at the boundary and be no longer locally compact. Second, Kato and Usui construct eight enlargements of D and describe their relations by a fundamental diagram, where four of these enlargements live in the Hodge theoretic area and the other four live in the algebra-group theoretic area. These two areas are connected by a continuous map given by the SL(2)-orbit theorem of Cattani-Kaplan-Schmid. This diagram is used for the construction in the first topic.

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