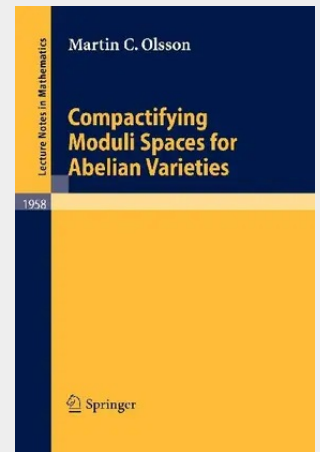


Compactifying Moduli Spaces for Abelian Varieties

This volume presents the construction of canonical modular compactifications of moduli spaces for polarized Abelian varieties (possibly with level structure), building on the earlier work of Alexeev, Nakamura, and Namikawa. This provides a different approach to compactifying these spaces than the more classical approach using toroidal embeddings, which are not canonical. There are two main new contributions in this monograph: (1) The introduction of logarithmic geometry as understood by Fontaine, Illusie, and Kato to the study of degenerating Abelian varieties; and (2) the construction of canonical compactifications for moduli spaces with higher degree polarizations based on stack-theoretic techniques and a study of the theta group.

The problem of compactifying the moduli space A of principally polarized g abelian varieties has a long and rich history. The majority of recent work has focused on the toroidal compactifications constructed over $\mathbb{C}$ by Mumford and his coworkers, and over $\mathbb{Z}$ by Chai and Faltings. The main drawback of these compactifications is that they are not canonical and do not represent any reasonable moduli problem on the category of schemes. The starting point for this work is the realization of Alexeev and Nakamura that there is a canonical compactification of the moduli space of principally polarized abelian varieties. Indeed Alexeev describes a moduli problem representable by a proper algebraic stack over $\mathbb{Z}$ which contains A as a dense open subset of one of its g irreducible components. In this text we explain how, using logarithmic structures in the sense of Fontaine, Illusie, and Kato, one can define a moduli problem $\mathcal{A}$ carving out the main component in Alexeev's space. We also explain how to generalize the theory to higher degree polarizations and discuss various applications to moduli spaces for abelian varieties with level structure.



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