A DEGENERATION OF MODULI OF HITCHIN PAIRS

The problem of constructing a natural theory of degenerations of the moduli space of Hitchin pairs on smooth curves is therefore of some significance. The purpose of this paper is to develop such a theory.

Let R be a discrete valuation ring with quotient field K and residue field an algebraically closed field k. Let $S = \text{Spec } R$, and Spec K the generic point and let s be the closed point of S. Let $X \to S$ be a proper, flat family with generic fibre X_K a smooth projective curve of genus $g \geq 2$ and with closed fibre X_s a stable singular curve C with a single node $p \in C$. Let (n, d) be a pair of integers such that $gcd(n, d) = 1$.

Let $\mathscr{M}(n,d)_K^H$ be the moduli space of stable Hitchin pairs of rank n and degree d on the generic fibre X_K of X/S . In this talk, I will discuss the construction and study a degeneration of the moduli space $\mathscr{M}(n,d)_K^H$ of rank n and degree d; this degeneration has analytic normal crossing singularities. Central to this theory is the geometry of the Hitchin fibre which reveals a somewhat new aspect of the theory of compactifications of Picard varieties of curves, which at the same time yields a degeneration of the classical Hitchin picture. In contrast to the usual theory of Picard compactifications, the ones which arise here have analytic normal crossing singularities; recall that when the number of nodes of the curve is strictly bigger than 1, the singularities of the compactified Picard variety is a *product of normal crossing singularities* and therefore *not* a normal crossing singularities (From the work of Oda-Seshadri and Caporaso). In this process a very natural toric picture shows up, which in a certain sense underlies the so-called *abelianization* philosophy.