

# Hong Kong Geometry Colloquium

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## Moduli of vector bundles on singular curves

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### Abstract

We will first recall the basic results on the moduli spaces of vector bundles on compact Riemann surfaces or more generally on smooth projective curves. These are generalizations of the classical Jacobian varieties which are moduli spaces of line bundles on a compact Riemann surface. The classical theta functions which are sections of some line bundles on the Jacobian variety have analogues for moduli spaces of vector bundles and are called “generalized theta functions”. The study of these spaces has acquired great interest, especially because of their connections with physics (conformal field theory, Verlinde formulae etc.). The classical theta functions can be represented as functions on the complex space  $\mathbb{C}^g$  – which is the simply – connected covering of the Jacobian of a curve of genus  $g$ . One can study generalized theta functions by a similar approach through spaces associated to loop groups. Another method of studying generalized theta functions is to study their behaviour when the curve degenerates to a curve with ordinary double points as singularities.

We will give an overview of these developments.