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Title: Picard bundles and Brill-Noether loci in the compactified jacobian of a nodal curve

Abstract: Let Y denote an irreducible projective nodal curve with K nodes and of genus $g(Y)$. We prove a generalization of the classical Poincare formula to the compactified Jacobian $J(Y),$ the moduli space of torsionfree sheaves of rank 1, fixed degree d on Y. We apply it to show that the Brill-Noether loci in J(Y) are nonempty if the Brill-Noether number is nonnegative. We prove that for $d\ge 2g(Y)$, the picard bundle on $J(Y)$ is stable but nor ample unlike in the case of a smooth curve. However for the pull back of the Picard bundle to the desingularization of $J(Y)$, the restriction to a general complete intersection subvariety of codimension K is ample. We use this to show that the Brill-Noether loci are connected if the Brill-Noether number is bigger than K. We prove that the Picard bundle is semistable for $d=2g(Y)-1$.