1015-13-224 **C-Y. Jean Chan*** (cchan@uark.edu), Department of Mathematics, University of Arkansas, Fayetteville, AR 72701, and **Claudia Miller** (cmille06@syr.edu), Department of Mathematics, Syracuse University, Syracuse, NY 13244. *An Application of the Riemann-Roch Formula in the Blow-up Algebra.* Preliminary report.

Let $(A, \mathfrak{m})$ be a regular local ring. The Rees algebra $A[\mathfrak{m}t]$ of A is the homogeneous ring of the blowup $X = \operatorname{Proj} A[\mathfrak{m}t]$ of $\operatorname{Spec} A$ at $\operatorname{Spec}(A/\mathfrak{m})$. Let $P_M(t)$ be the Hilbert-Samuel polynomial of a finitely generated A-module M such that $P_M(n) = \ell(M/\mathfrak{m}^n M)$ for $n \gg 0$. The *Rees module* $R_{\mathfrak{m}}(M) = \oplus_{n \geq 0} \mathfrak{m}^n M$ of M is a graded module over $A[\mathfrak{m}t]$.

In graded cases, the Riemann-Roch formula relates the Euler characteristic of a graded module to its Chern characters. In this work, we apply the Grothendieck-Riemann-Roch theorem to the blow-up X of $\operatorname{Spec} A$ and obtain an alternative formula which relates the Hilbert-Samuel polynomial $P_M(t)$ of M over the local ring A to the Chern characters of the graded Rees module $R_{\mathfrak{m}}(M)$ over the graded ring $A[\mathfrak{m}t]$. (Received February 06, 2006)