1093-14-234 **Zhaoting Wei*** (zhaotwei@indiana.edu), Indiana University, Department of Mathematics, 831 E 3rd Street, Bloomington, IN 47405. *Riemann-Roch Theorem and Duflo's Isomorphism Theorem.* Preliminary report.

For a smooth variety X, the *Atiyah Class* gives a map

$$\mathcal{T}_X[-1] \otimes \mathcal{T}_X[-1] \to \mathcal{T}_X[-1]$$

in the derived category $\mathcal{D}(X)$. This map makes $\mathcal{T}_X[-1]$ a Lie algebra object $\mathfrak{g}$ in $\mathcal{D}(X)$. Moreover, $\bigoplus_k \bigwedge^k \mathcal{T}_X[-k]$ correspond to $S(\mathfrak{g})$ and $p_{1*}(\mathrm{R}\mathcal{H}om_{X\times X}(\mathcal{O}_X, \mathcal{O}_X))$ gives the universal enveloping algebra $U(\mathfrak{g})$.

The HRK map

$$I_{\mathrm{HRK}} : \bigoplus_k \bigwedge^k \mathcal{T}_X[-k] \to p_{1*}(\mathrm{R}\mathcal{H}om_{X\times X}(\mathcal{O}_X, \mathcal{O}_X)).$$

fails to be an algebraic homomorphism. To make is compatible with the multiplication, we need to modify it with some certain power series of the Atiyah class, with coefficients coming from the Todd genus. This leads to the Riemann-Roch Theorem.

On the other hand in Lie theory we have the Duflo's isomorphism theorem

$$S(\mathfrak{g})^{\mathfrak{g}} \to Z(U(\mathfrak{g})),$$

which is analogous to the map in algebraic geometry.

I will explain the relation between these two theorems. Moreover, I will talk about how this idea leads to a generalization of Duflo's isomorphism theorem to *family algebras*. (Received August 16, 2013)