Hirzebruch $\chi_y$-genera of complex algebraic fiber bundles—the multiplicativity of the signature modulo 4. (English) [Zbl 1391.14012]


From the introduction: We consider the difference of the Hirzebruch $\chi_y$-genus, $\chi_y(E) - \chi_y(F)\chi_y(B)$, more precisely we try to express the difference in terms of the Euler-Poincaré characteristic, the Todd genus and the signature. As a byproduct of the proofs, it turns out that from the explicit formula describing the difference $\chi_y(E) - \chi_y(F)\chi_y(B)$ we obtain various results, for example we obtain that the signature of such a fiber bundle is multiplicative mod 4, i.e. $\sigma(E) \equiv \sigma(F)\sigma(B) \mod 4$, which is compatible with the above-mentioned result of I. Hambleton et al. [Geom. Topol. 11, 251–314 (2007; Zbl 1136.55013)]. In this sense our result can be said to be an interesting application of the Hirzebruch $\chi_y$-genus to the “multiplicativity problem” of the signature, and also that only the Euler-Poincaré characteristic is multiplicative for any such fiber bundles.

In the case of possibly singular varieties, for the difference of the $\chi_y$-genus $\chi_y(X)$ and the motivic Hirzebruch class $T_y^*(X)$ and their intersection-homological analogues $I\chi_y(X)$ and $IT_y^*(X)$.

For the entire collection see [Zbl 1382.14002].

MSC:

14C17 Intersection theory, characteristic classes, intersection multiplicities in algebraic geometry

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