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**Felipe Perez** (jperezvallejo@gsu.edu) and **Yongwei Yao\*** (yyao@gsu.edu), Department of Mathematics and Statistics, Georgia State University, Atlanta, GA 30302. *Uniformity in reduction to characteristic  $p$ .*

Let  $A$  be a Noetherian domain and  $R$  a f.g.  $A$ -algebra. For every  $P \in \text{Spec}(A)$  such that the residue field  $\kappa(P)$  has prime characteristic, consider the fiber ring  $R_{\kappa(P)}$ .

We obtain uniform properties of  $R_{\kappa(P)}$  for all  $P$  within a non-empty open subset. There is a uniform bound for all the normalized Hilbert-Kunz functions of all localizations of  $R_{\kappa(P)}$ . Under mild conditions, there is a uniform rate of convergence for the sequence of normalized Hilbert-Kunz functions and the sequence of normalized F-splitting numbers.

As corollaries, consider a finitely generated  $\mathbb{Z}$ -algebra  $R$  (say reduced). Let  $I$  be an ideal of  $R$  such that, mod  $\mathfrak{p}$ ,  $R_{\mathfrak{p}}/I_{\mathfrak{p}}$  has finite length for all  $\mathfrak{p} \gg 0$ . Then the convergence of  $e_{HK}(I_p, R_p)$  is equivalent to the convergence of  $\ell(R_p/I_p^{[p]})$  as  $p \rightarrow \infty$ ; and they have the same limit if convergence occurs. (Similar results have been obtained independently by K. Tucker and independently by V. Trivedi.) We also get corresponding results for normalized F-splitting numbers and F-signature.

General results are obtained in terms of an  $R$ -module  $M$  instead of  $R$ . And they cover all the results above as special cases. This is joint work with Felipe Perez. (Received January 19, 2016)