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Hilbert-Kunz functions of normal local rings. Preliminary report.

Let (R, m, k) be an excellent, local, normal ring of characteristic p with a perfect residue field and $\dim R = d$. Let n be a varying non-negative integer and let $q = p^n$. It is known that if I is an m -primary ideal of R , and M is a finitely generated R -module, then there exists a real number b such that the length of $M/I^{[q]}M$ can be written as $aq^d + bq^{d-1} + O(q^{d-2})$. This talk will report on extensions of the previously mentioned work regarding the existence of a second coefficient in the Hilbert-Kunz function of an m -primary ideal in a normal local ring of positive characteristic. (Received March 07, 2006)