1015-13-93 Andrew R. Kustin\* (kustin@math.sc.edu), Mathematics Department, University of South Carolina, Columbia, SC 29208, and Adela N. Vraciu. Socle degrees of Frobenius powers. Preliminary report.

**Theorem.** Let k be a field of positive characteristic p,  $q = p^e$  for some positive integer e, P be a positively graded polynomial ring over k, and R = P/C be a complete intersection ring with C generated by a homogeneous regular sequence. Let  $\mathfrak{m}$  be the maximal homogeneous ideal of R, J be a homogeneous  $\mathfrak{m}$ -primary ideal in R, and I be a lifting of J to P. Let  $\ell$  be the dimension of the socle  $(J\mathfrak{m})/J$  of R/J and  $d_1, \ldots, d_\ell$  be the degrees of the generators of the socle. Then the following statements are equivalent:

- (a)  $\operatorname{pd}_R R/J < \infty$ ,
- (b) the socle  $(J^{[q]}\mathfrak{m})/J^{[q]}$  of  $R/J^{[q]}$  has dimension  $\ell$  and the degrees of the generators are  $qd_i (q-1)a$ , for  $1 \le i \le \ell$ , where a denotes the a-invariant of R,
- (c)  $(C+I)^{[q]}(C^{[q]}C) = C+I^{[q]}$ , and
- (d)  $I^{[q]} \cap C = (I \cap C)^{[q]} + CI^{[q]}.$

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