1023-13-1456   **David Eisenbud*** (`de@msri.org`), MSRI, 17 Gauss Way, Berkeley, CA 94720. *Assymptotic Castelnuovo-Mumford Regularity.* Preliminary report.

Let k be a field and let $S = k[x_{,...,}x_n]$ be a polynomial ring over k. A remarkable result of Cutkosky-Herzog-Trung, reproved independently with slightly different information by Kodiyalam, asserts that if I is a homogeneous ideal in S, then the Castelnuovo-Mumford regularity of I^p grows linearly as a function of p for large p

$$\text{reg } I^n = dp + c \text{ for } p >> 0$$

for some integers d and c. The integer d can be uunderstood in terms of minimal reductions of I (Kodiyalam). The constant term c seems more mysterious.

I will show how to understand the constant term in the special case where I is generated by forms of a single degree and is primary to the ideal $(x_1, ..., x_n)$, and discuss some further cases and bounds. This work is part of an ongoing project with Joe Harris and Craig Huneke. (Received September 26, 2006)

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