1047-13-442   **Neil Epstein*** (`neilme@umich.edu`), University of Michigan, 2074 East Hall, 530 Church St., Ann Arbor, MI 48109, and **Yongwei Yao**, Georgia State University, Atlanta, GA. *A numerical criterion for tight closure of arbitrary ideals.*

Let (R, m) be a quasi-unmixed Noetherian local ring of prime characteristic $p > 0$. Given two ideals $J \subseteq I$, where J is m-primary, I and J have the same tight closure iff they have the same Hilbert-Kunz multiplicity. A more general theorem holds, due to Hochster and Huneke, when I/J has finite length. But what if I/J isn't a finite-length module? We have defined an extension of Hilbert-Kunz multiplicity to all ideal pairs $J \subseteq I$, which is a kind of analogue of j-multiplicity, which gives a sufficient condition for the tight closures of J and I to agree. In some cases, the condition is also necessary. (Received February 03, 2009)

1