

Lech's inequality and the Stuckrad-Vogel conjecture

Patricia Klein, University of Kentucky, Lexington, KY – 40506

Abstract

Let (R, m) be a Noetherian local ring, and let M be a finitely generated R -module of dimension d . Let $e(I, M)$ denote the Hilbert-Samuel multiplicity of M on the ideal I . Lech's inequality states that the set $\ell(R/I)/e(I, R)$, as I runs through all m -primary ideals, is bounded below by $1/d!e(m, R)$. Stuckrad and Vogel showed that this set is not in general bounded above. However, they conjectured that whenever the completion of M is equidimensional that $\ell(M/IM)/e(I, M)$ will indeed be bounded above. We prove this conjecture. This talk is based on joint work with Linqun Ma, Pham Hung Quy, Ilya Smirnov, and Yongwei Yao.

Keywords: Noetherian ring, finitely generated module, Hilbert-Samuel multiplicity.