The 9th Seminar on Commutative Algebra and Related Topics
Ferdowsi University of Mashhad, November 7-8, 2012

A characterization of distinguished pairs

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Abstract

Let v be a Henselian valuation of any rank of a field K, and let $\overline{v}$ be the unique extension of v to a fixed algebraic closure $\overline{K}$ of K with value group $\overline{G}$. In 2005, Aghigh and Khanduja studied properties of those pairs (θ, α) of elements of $\overline{K}$ where α is an element of smallest degree over K such that $\overline{v}(\theta-\alpha) = \sup\{\overline{v}(\theta-\beta)|\ \beta \in \overline{K},\ [K(\beta) : K] < [K(\theta) : K]\}$. Such these pairs are referred to as distinguished pairs. In other words, a pair $(\theta,\ \alpha)$ of elements of $\overline{K}$ is called a distinguished pair if the following three conditions are satisfied: (i) $\overline{v}(\theta-\alpha) = \sup\{\overline{v}(\theta-\beta)|\ \beta \in \overline{K},\ [K(\beta) : K] < [K(\theta) : K]\}$; (ii) $[K(\alpha) : K] < [K(\theta) : K]$; (iii) if $\gamma \in \overline{K}$ with $[K(\gamma) : K] < [K(\alpha) : K]$, then $\overline{v}(\theta-\gamma) < \overline{v}(\theta-\alpha)$. In this research, our aim is to give a different characterization of distinguished pairs. We use the notation of lifting of monic polynomials to present this new classification.

Joint work: K. Aghigh.