SEMINARIO

S. Dale Cutkosky
University of Missouri

Finite generation of associated graded rings along arbitrary valuations

Abstract: In this talk we consider the question of when the associated graded ring along a valuation, $\mathrm{gr}_{\nu^*}(S)$, is a finite $\mathrm{gr}_{\nu^*}(R)$-module, where S is a normal local ring which lies over a normal local ring R and ν^* is a valuation of the quotient field of S which dominates S.

We begin by discussing some examples and results allowing us to refine the conditions under which finite generation can hold. We must impose the condition that the extension of valuations is *defectless* and perform a birational extension of R along the valuation to obtain finite generation (replacing S with the local ring of K^* determined by the valuation). With these assumptions, we have that finite generation holds, when R is a two dimensional excellent local ring.

Our main result is to show that for an arbitrary valuation in an algebraic function field over an arbitrary field of characteristic zero, after a birational extension along the valuation, we always have finite generation (all finite extensions of valued fields are defectless in characterisitic zero). This generalizes an earlier result, showing that finite generation holds (after a birational extension) with the additional assumptions that ν has rank 1 and has an algebraically closed residue field. There are essential difficulties in removing these assumptions. As an ingredient in the proof, w e also obtain general results for unramified extensions of excellent local rings.

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