

Generating Sequences of Valuations and Applications

Pham An Vinh

Dr. Steven Dale Cutkosky, Dissertation Supervisor

Abstract

The thesis consists of three parts. In the first part, we present an algorithmic construction of a special generating sequence of a valuation dominating a two dimensional regular local ring. As a corollary, we give a complete characterization of the semigroup and the residue field of such a valuation and some other applications.

In the second part, we apply this construction to study ramification theory of valuations. In particular, we show that for stable ring extensions of dimension two over a ground field of characteristic zero along a valuation, their associated graded rings (to the valuation) satisfy a nice relation. We also show that such a relation holds for Abhyankar valuations for any dimension and ground field of characteristic zero.

In the last part, we show the converse that if the two generating sequences are essentially the same then the ring extension is stable.