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On prolongations of rank one discrete valuations

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Abstract: Let (K, ν) be a valued field, where ν is a rank one discrete valuation. Let R be its ring of valuation, \mathfrak{m} its maximal ideal, and L an extension of K , defined by a monic irreducible polynomial $F(X) \in R[X]$. Assume that $\overline{F}(X)$ factors as a product of r distinct powers of monic irreducible polynomials. In this paper a condition which guarantees the existence of exactly r distinct valuations of K extending ν is given, in such a way that it generalizes the results given in the paper “Prolongations of valuations to finite extensions” by S. K. Khanduja, M. Kumar (2010).

Keywords: discrete valuation; extension of valuation; prime ideal factorization

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REFERENCES

- [1] Cohen S. D., Movahhedi A., Salinier A., *Factorization over local fields and the irreducibility of generalized difference polynomials*, *Mathematika* **47** (2000), no. 1–2, 173–196.
- [2] Deajim A., El Fadil L., *On the extensions of a discrete valuation in a number field*, *Math. Slovaca* **69** (2019), no. 5, 1009–1022.
- [3] Dedekind R., *Über den Zusammenhang zwischen der Theorie der Ideale und der Theorie der höheren Kongruenzen*, *Abhandlungen der Königlichen Gesellschaft der Wissenschaften in Göttingen* **23** (1878), 3–38 (German).
- [4] Guàrdia J., Montes J., Nart E., *Newton polygons of higher order in algebraic number theory*, *Trans. Amer. Math. Soc.* **364** (2012), no. 1, 361–416.
- [5] Hensel K., *Untersuchung der Fundamentalgleichung einer Gattung für eine reelle Primzahl als Modul und Bestimmung der Theiler ihrer Discriminante*, *J. Reine Angew. Math.* **113** (1894), 61–83 (German).
- [6] Khanduja S. K., Kumar M., *On a theorem of Dedekind*, *Int. J. Number Theory* **4** (2008), no. 6, 1019–1025.
- [7] Khanduja S. K., Kumar M., *Prolongations of valuations to finite extensions*, *Manuscripta Math.* **131** (2010), no. 3–4, 323–334.
- [8] Khanduja S. K., Kumar M., *A generalization of a theorem of Ore*, *J. Pure Appl. Algebra* **218** (2014), no. 7, 1206–1218.
- [9] Neukirch J., *Algebraic Number Theory*, *Grundlehren der Mathematischen Wissenschaften*, 322, Springer, Berlin, 1999.
- [10] Ore Ö., *Newtonsche Polygone in der Theorie der algebraischen Körper*, *Math. Ann.* **99** (1928), no. 1, 84–117 (German).