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Ramification in Bad Characteristics

Let C be a curve over a p-adic field F and $K = F(C)$. For division algebras of exponent prime to p, it is known that index divides the square of the exponent and division algebras of prime degree are cyclic. Both results avoid the prime p because in that case there is no good theory of ramification of Brauer group elements. However, one can try and avoid this obstacle by defining the ramification group of a discrete valued field K with valuation ring R as the quotient of Brauer groups $\mathrm{Br}(K)/\mathrm{Br}(R)$ and then study the functorial properties of this quotient. One is then led to the complete case and to consider the paper *A generalization of local class field theory by using K groups I*, by Kazuya Kato (J. Fac. Sci. Univ. Tokyo Sect. IA **26**(1979), 303–376). We will discuss the progress we have made on this problem using Kato's work.