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On the Classification of Field Extensions of p -adic Fields

Let p be a prime and let \mathbb{Q}_p be the field of p -adic numbers. It is known that the number of finite extensions of \mathbb{Q}_p of a given degree is finite up to isomorphism. Given a finite algebraic extension L of \mathbb{Q}_p generated by the root of an irreducible polynomial h , we present a practical (closed-form) method to determine the isomorphism class in which L lives, based on the coefficients of h . We will discuss the subtleties of the case when the degree of the extension coincides with p , the characteristic of the residue field.