Maurizio Monge
Mathematical Publication List (as of August 19, 2013)

- M. Monge, **Generation of the symmetric field by Newton polynomials in prime characteristic**, *published in Rocky Mountains Journal (2012).*

  It was proved by Dvornicich-Zannier that the polynomials $x^a + y^a$, $x^b + y^b$, x^c+y^c generate the field of symmetric function in x, y over $\mathbb{Q}$, when a,b,c have no common factor. We extend the result in prime characteristic p, under the additional hypothesis that a, b, c, and their pairwise differences, are all prime with p. The additional hypotheses are proved to be necessary with a family of counterexamples.

  Links: `http://arxiv.org/abs/0903.3192`,
  `http://projecteuclid.org/euclid.rmjm/1335187175`

- N. Dubbini, M. Monge, **An equivalent of Kronecker's Theorem for powers of an algebraic number and structure of linear recurrences of fixed length**, *published in Acta Arithmetica (2012).*

  Let α be an algebraic number and m a fixed integer. Given m real numbers $x_1, \ldots, x_m$, we estimate about how well we can simultaneously approximate modulo 1 each x_i by $t\alpha^i$, for some real t. The best possible approximation is related to the Mahler measure of α, and the estimate is proved to be best-possible up to a constant. During the proof we obtain a result of independent interest on the existence of a special basis of the module of linear recurrences of fixed length over the p-adic integers $\mathbb{Z}_p$.

  Links: `http://arxiv.org/abs/0910.5182`,
  `http://journals.impan.gov.pl/aa/Inf/153-1-2.html`

- M. Monge, **On perfect hashing of numbers with sparse digit representation via multiplication by a constant**, *published in Applied Discrete Mathematics (2010).*

  Small note on a hashing technique, consisting in mapping the information contained in numbers formed by sparse non-zero digits into consecutive digits, via multiplication by a constant number. An estimate on the length of the interval of consecutive digits necessary to do this is obtained.

  Links: `http://arxiv.org/abs/1003.3196`,
  `http://www.sciencedirect.com/science/article/pii/S0166218X11000837`

- M. Monge, **Determination of the number of isomorphism classes of extensions of a $\mathfrak{p}$-adic field**, *published in Journal of Number Theory (2010).*

We solve the problem of enumerate isomorphism classes of extensions of a p-adic field. A combinatorial lemma allows to solve the problem in full generality, reducing the computation to Krasner Formula, which counts all extensions in the algebraic closure, and the computation of cyclic extensions, which can be obtained via local class field theory.

Links: `http://arxiv.org/abs/1011.0357`,
`http://www.sciencedirect.com/science/article/pii/S0022314X11000758`

- A. Cobbe and M. Monge, **Answer to a question on A-groups, arisen from the study of Steinitz classes**, *submitted (2011)*.

  We show that the families of solvable A-groups and A'-groups are different, with a counterexample which is already too big to be found via an exhaustive search. They had been conjectured to be equal in A. Cobbe's thesis. We prove that the conjecture is true when only two primes divide the order of the group. The conjecture on Steinitz classes is shown to be verified for the counterexamples provided.

  Link: `http://arxiv.org/abs/1109.2065`

- M. Monge, **A characterization of Eisenstein polynomials generating cyclic extensions of degree p^2 and p^3 over an unramified $\mathfrak{p}$-adic field**, *accepted with revision to Journal de Théorie des Nombres de Bordeaux (2013)*.

  We show a quite general technique to derive necessary and sufficient conditions on the coefficients of a polynomial, for it to have a prescribed Galois group. We can recover easily Lbekkouri's criterion for polynomials of degree p^2 generating a cyclic extension, generalizing it to fields that are unramified extensions of the rational p-adic field $\mathbb{Q}_p$.

  When some hypothesis is not satisfied, we show that the first unsatisfied hypothesis in the list gives information about the Galois group of the normal closure. Exploiting this information we can give a complete description of polynomials of degree p^2 whose splitting field is a p-extension.

  We apply the same methods to give necessary and sufficient conditions on coefficients of polynomials of degree p^3 to generate a cyclic extension, the conditions are quite complicated, but can be derived in a relatively straightforward way.

  Link: `http://arxiv.org/abs/1109.4616`

- M. Monge, **A family of Eisenstein polynomials generating totally ramified extensions, identification of extensions and construction of class fields**, *accepted with revision to Internation Journal of Number Theory (2013)*.

We present a family of special polynomials generating totally ramified extensions of local field K. We prove that each extension is generated by at least a special polynomial, but the number of special polynomials generating one extension L is at most the number of conjugates of L/K in the algebraic closure, and in particular it is unique for Galois extensions. A reduction algorithm is presented, and its study allows to characterize the set of special polynomials in terms of the intermediate extensions. A characterization of Eisenstein polynomials of degree p generating a Galois extensions is obtained topologically.

A criterion that can ensure that two polynomials generate non-isomorphic extensions is provided. The criterion is particularly effective when a polynomial is known to generate a Galois extension, and does not only depend on the first-order value of the difference of the polynomials evaluated on a uniformizing element.

We describe an algorithm which allows to construct a totally ramified class field, given a suitable description of a norm subgroup. A constructive proof of the Existence Theorem of local class field theory is obtained, constructing a unique extension with prescribed norm group and degree equal to the index, which can also be easily shown to be Galois.

Link: `http://arxiv.org/abs/1109.4617`