Dynatomic polynomials associated with distinguished polynomials.

(A survey)

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ABSTRACT. Let K be field and $h \in K[z]$ be a monic polynomial for any integer $\nu \geq 1$, the ν-th dynatomic polynomial of h is defined to be

$\Phi_{\nu,h} = \prod_{d|\nu} \left(h^{\circ d}(z) - z\right)^{\mu\left(\frac{\nu}{d}\right)}$. The properties of dynatomic polynomials have been extensively studied by Morton and Patel.

For $h(z)$ written in the form $h(z) = z+g(z)$, the polynomials $g_\nu(z) = h^{\circ\nu}(z)-z$ are in consderation. Now let L be a complete valued field of residue characteristic $p \neq 0$ and assume that the monic polynomial g has its cœfficients in the valuation ring of L and is distinguished.

Then, denoting by $\overline{L}$ the residue field of L, for any integer $\nu \geq 1$, we obtain by reduction in $\overline{L}$ an additive polynomial $\overline{g_\nu}$ independent from g and if ν is a prime number, we obtain a nice formula for the reduction of $\Phi_{\nu,h}$. We consider the particular case of distinguished polynomials of the form $g(z) = a_0 + z^p$, that is $|a_0| < 1$. We then study for L equal the field p-adic numbers the 3-dynatomic polynomial $\Phi_{3,h}$ of $h(z) = a_0 + z + z^p$ and its roots, when $p = 2$, 3, 5 and 7.

The Schönemann irreductibility criterion, the Berlekamp algorithm and the Krasner's Lemma are the tools that we use for this work.