RATIONAL DYNAMICS ON THE PROJECTIVE LINE OF THE FIELD OF p-ADIC NUMBERS

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ABSTRACT. The rational maps are studied as dynamical systems on the projective line $\mathbb{P}^1(\mathbb{Q}_p)$ of the field $\mathbb{Q}_p$ of p-adic numbers. We divide the space into two invariant parts: Julia set and Fatou set. For a rational map without critical point, the subsystem on the Julia set is topologically conjugate to some subshift of finite type on an alphabet of finite symbols, i.e., finite states Markov shift, and the subsystem on the Fatou set is described by a decomposition of minimal subsystems. However, if the rational map admits critical points, its dynamical behavior becomes complicated. In general, we prove that for a geometrically finite rational map, i.e., every critical point has finite forward orbit, the dynamics on its Julia set is topologically conjugate to a countable states Markov shift. As an example, a description of the dynamics of the cubic polynomial $\frac{9}{4}x(x-1)^2$ on $\mathbb{P}^1(\mathbb{Q}_2)$ will be given. This is a joint work with Shilei Fan, Hongming Nie and Yuefei Wang.

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