1147-11-423 **Vefa Goksel*** (goksel@math.wisc.edu). *Markov Processes and Some PCF Quadratic Polynomials.*

For any $n \geq 1$, let T_n be the complete binary rooted tree of height n, and $f(x) = (x+a)^2 - a - 1$ such that $a \neq \pm b^2$ for any $b \in \mathbb{Z}$. In 2012, Jones and Boston empirically observed that iteratively applying a certain Markov process on the factorization types of f gives rise to certain permutation groups $M_n(f) \leq \mathrm{Aut}(T_n)$ for $n \leq 5$. We prove a refined version of this phenomenon for all n, and for all the irreducible post-critically finite quadratic polynomials with integer coefficients, except for certain conjugates of $x^2 - 2$. We do this by constructing these groups explicitly. Although there have already been some conjectures relating the Markov processes to the dynamics of quadratic polynomials, our results are the first to prove such a connection. If $f(x) \in \mathbb{Z}[x]$ is a post-critically finite quadratic polynomial, and $G_n(f)$ is the Galois group of f^n over $\mathbb{Q}(i)$, then we conjecture that for all $n \geq 1$, $M_n(f)$ contains a subgroup isomorphic to $G_n(f)$, analogous to the role of Mumford-Tate groups in classical arithmetic geometry. We provide evidence that this is implied by a purely group theoretical statement. (Received January 23, 2019)