1106-11-1113 **Ashvin Anand Swaminathan*** (aaswaminathan@college.harvard.edu), 388 Eliot Mail Center, Harvard College, 101 Dunster Street, Cambridge, MA 02138. *On Arboreal Galois Representations of Rational Functions.*

The action of the absolute Galois group $\mathrm{Gal}(K^{\mathrm{sep}}/K)$ of a global field K on a tree $T(\phi, \alpha)$ of iterated preimages of $\alpha \in \mathbb{P}^1(K)$ under $\phi \in K(x)$ with $\deg(\phi) \geq 2$ induces a homomorphism $\rho : \mathrm{Gal}(K^{\mathrm{sep}}/K) \to \mathrm{Aut}(T(\phi, \alpha))$, called an arboreal Galois representation. We address questions of Jones and Manes about the size of $G(\phi, \alpha) := \mathrm{im}\rho$. We consider two cases: (1) ϕ is such that $\{a_n\}$ defined by $a_0 = \alpha$ and $a_n = \phi(a_{n-1})$ is periodic, and (2) ϕ commutes with a nontrivial Möbius transformation that fixes α.

In the first case, we resolve a question of Jones about the size of $G(\phi, \alpha)$, and taking $K = \mathbb{Q}$, we describe the Galois groups of iterates of $\phi \in \mathbb{Z}[x]$ when $\phi(x) = x^2 + kx$ or $\phi(x) = x^2 - (k+1)x + k$. Taking $\phi(x) = x^2 + kx \in \mathbb{Z}[x]$, we employ a result of Jones regarding the size of the group $G(\psi, 0)$, where $\psi(x) = x^2 - kx + k$, to obtain a zero-density result for primes dividing terms of $\{a_n\}$. In the second case, we resolve a conjecture of Jones about the size of a certain subgroup $C(\phi, \alpha) \subset \mathrm{Aut}(T(\phi, \alpha))$ that contains $G(\phi, \alpha)$. (Received September 10, 2014)