REPRESENTATIONS OF BRAID GROUPS VIA CYCLIC COVERINGS OF THE SPHERE: ZARISKI CLOSURE AND ARITHMETICITY

NGUYEN DUC MANH

Let d be an integer and $\kappa= (k_1, ..., k_n)$ a sequence of n positive integers, with n at least 3, such that $(d,k_1,\dots,k_n)=1$. By considering the family of Riemann surfaces constructed from algebraic curves of the form $y^d=\prod_{i=1}^n (x-b_i)$, where $b_1, ..., b_n$ are n distinct complex numbers, we obtain a representation $\rho_{d,\kappa}$ of the pure braid group PB_n with image in some semisimple algebraic group G defined over Q. Representations of PB_n arising this way include the ones discovered by Deligne and Mostow, whose images give examples of complex hyperbolic lattices. In this talk we discuss the following questions: (Q1) When does $\rho_{d,\kappa}(PB_n)$ have maximal Zariski closure in G? and (Q2) When is $\rho_{d,\kappa}(PB_n)$ an arithmetic subgroup of G? Our results provide answers to these questions and generalize former results by Venkataramana. This is a joint work with Gabrielle Menet.