Department Of Mathematics

Algebra, Number Theory, and Discrete Math Seminar

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Title: Quasi-Critical Points of Toroidal Belyĭ Maps

Abstract: A Belyĭ map $\beta : \mathbb{P}^1(\mathbb{C}) \to \mathbb{P}^1(\mathbb{C})$ is a rational function with at most three critical values; we may assume these values are $\{0, 1, \infty\}$. Replacing $\mathbb{P}^1$ with an elliptic curve $E : \ y^2 = x^3 + A\,x + B$, there is a similar definition of a Belyĭ map $\beta : E(\mathbb{C}) \to \mathbb{P}^1(\mathbb{C})$. Since $E(\mathbb{C}) \simeq \mathbb{T}^2(\mathbb{R})$ is a torus, we call (E, β) a Toroidal Belyĭ pair.

There are many examples of Belyĭ maps $\beta : E(\mathbb{C}) \to \mathbb{P}^1(\mathbb{C})$ associated to elliptic curves; several can be found online at `LMFDB`. Given such a Toroidal Belyĭ map of degree N, the inverse image $G = \beta^{-1}\big(\{0, 1, \infty\}\big)$ is a set of N elements which contains the critical points of the Belyĭ map. In this project, we investigate when G is contained in $E(\mathbb{C})_{\text{tors}}$.

This is joint work with Tesfa Asmara (Pomona College), Erik Imathiu-Jones (California Institute of Technology), Maria Maalouf (California State University at Long Beach), Isaac Robinson (Harvard University), and Sharon Sneha Spaulding (University of Connecticut). This was work done as part of the Pomona Research in Mathematics Experience (NSA `H98230-21-1-0015`).

Wednesday February 21, 2024
LO1328
2:15 PM – 3:15 PM
and Via Zoom meeting
Request link from daniel.katz@csun.edu

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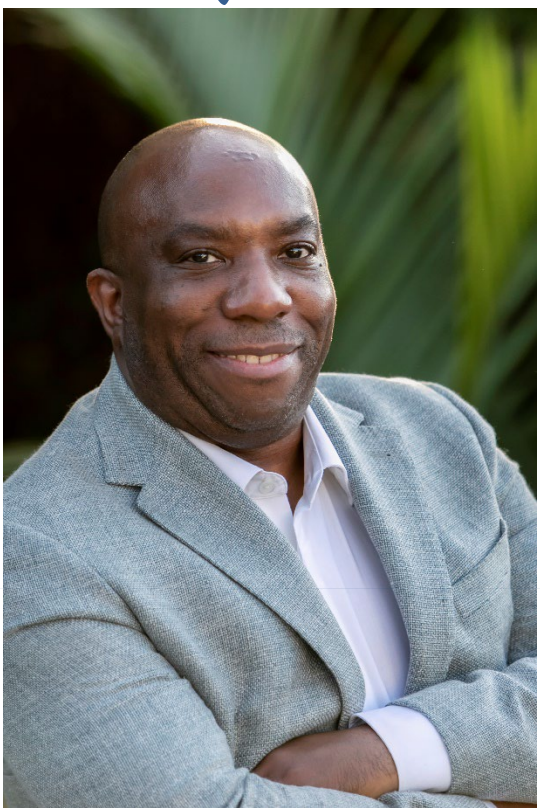

Edray Herber Goins grew up in South Los Angeles, California. The product of the Los Angeles Unified (LAUSD) public school system, Goins attended the California Institute of Technology, where he majored in mathematics and physics, and earned his doctorate in mathematics from Stanford University. He has worked as a researcher at both Harvard and the National Security Agency; and has taught at both Caltech and Purdue. Goins is currently a Professor of Mathematics at Pomona College in Claremont, California. He has published over 25 journal articles in areas such as applied mathematics, graph theory, number theory, and representation theory; and on topics such as Diophantine equations, elliptic curves, and African Americans in mathematics. He runs a federally-funded Research Experience for Undergraduates (REU) titled Pomona Research in Mathematics Experience (PRiME).