

A SAGE Package for n-Gonal Equisymmetric Stratification of M-g

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EXPERIMENTAL MATHEMATICS

DOI: 10.1080/10586458.2020.1763872



Acceso anticipado: JUN 2020

Tipo de documento: Article; Early Access

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Abstract

In this work, we present an algorithm running over SAGE, which allows users to deal with group actions on Riemann surfaces up to topological equivalence. Our algorithm allows us to study the equisymmetric stratification of the branch locus $B-g$ of the moduli space $M-g$ of compact Riemann surfaces of genus $g \geq 2$, corresponding to group actions with orbit genus 0. That is, it works for actions on surfaces of any genus in the case the genus of the quotient surface is zero, except for obvious hardware constraints. Our approach is toward studying inclusions and intersections of (closed) strata of $B-g$. We apply our algorithm to describe part of the geometry of the branch locus $B-9$, in terms of equisymmetric stratification. We also use it to compute all group actions up to topological equivalence for genus 5-10, this completes the lists. Finally, we add an optimized version of an algorithm, which allows us to identify Jacobian varieties of CM-type. As a byproduct, we obtain a Jacobian variety of dimension 11 which is isogenous to $E-i(9) \times E-i \text{ root } 3(2)$, where $E-i$ and $E-i \text{ root } 3$ are elliptic curves with complex multiplication.

Palabras clave

Palabras clave de autor: [group actions](#); [classification of actions](#); [equisymmetric stratification](#); [Riemann surfaces](#)

KeyWords Plus: [COMPACT RIEMANN SURFACES](#); [RAMIFICATION INDEXES](#); [AUTOMORPHISM-GROUPS](#); [ABELIAN-VARIETIES](#); [CYCLIC ACTIONS](#); [MODULI SPACE](#); [BRANCH LOCI](#); [ALGORITHM](#); [ORDERS](#); [PRIME](#)

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Financiación

Entidad financiadora	Número de concesión
ANID-FONDECYT grant	1180073

[Ver texto de financiación](#)

Editorial

TAYLOR & FRANCIS INC, 530 WALNUT STREET, STE 850, PHILADELPHIA, PA 19106 USA

Información de la revista

- **Impact Factor:** [Journal Citation Reports](#)

Categorías / Clasificación

Áreas de investigación:Mathematics

Categorías de Web of Science:Mathematics

Información del documento

Idioma:English

Número de acceso: WOS:000545246200001

ISSN: 1058-6458

eISSN: 1944-950X