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Equations of Riemann surfaces with automorphisms via partial flattening stratifications. Preliminary report.

Riemann surfaces with automorphisms have been studied since the 19th century, but many questions remain open. Computer searches have yielded lists of possible automorphism groups of Riemann surfaces. Equations of many of these surfaces are known, but in general there is no algorithm to determine these equations. I will present one such strategy which uses a mixture of group theory, representation theory, and algebraic geometry. In particular, computing partial flattening stratifications has allowed me to compute equations of many new examples of equations for genus 6 through 10 Riemann surfaces. (Received September 17, 2015)