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by

Eriko Hironaka

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Web:	http://topology.auburn.edu/tp/
Mail:	Topology Proceedings Department of Mathematics & Statistics Auburn University, Alabama 36849, USA
E-mail:	topolog@auburn.edu
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QUOTIENT FAMILIES OF MAPPING CLASSES

ERIKO HIRONAKA

Abstract. We define quotient families of mapping classes parameterized by rational points on an interval, generalizing an example of R. C. Penner. This gives an explicit construction of families of mapping classes in a single flow-equivalence class of monodromies of a fibered 3-manifold M. The special structure of quotient families helps to compute global invariants of the mapping torus such as the Alexander polynomial, and (in the case when M is hyperbolic) the Teichmüller polynomial of the associated fibered face. These in turn give useful information about the homological and geometric dilatations of the mapping classes in the quotient family.

1. Introduction

In [10], R. C. Penner constructs a sequence of pseudo-Anosov mapping classes, sometimes called *Penner wheels*, with asymptotically small dilatations. In this paper, we define a generalization of Penner wheels called *quotient families*, and put them in the framework of the fibered face theory as discussed in [4], [8], and [11]. Specifically, we show that each quotient family corresponds naturally to a linear segment of a fibered face of a 3-manifold. Putting quotient families in the fibered face context helps to determine their Nielsen–Thurston classification, and, in the pseudo-Anosov case, makes it possible to compute dilatations via the Teichmüller polynomial.

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