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On Thurston's construction of a surjective homomorphism $H_{2n+1}(B\Gamma_n, \mathbb{Z}) \to \mathbb{R}$

Tadayoshi Mizutani

Translated by Taro Asuke

§ Translator's remarks

This article is an English translation of notes by T. Mizutani on a theorem of Thurston [3]. The notes include a construction which seems not quite well-known, of a family of foliations of which the Godbillon–Vey class varies continuously. The contents are kept as it was. Some apparent errors are corrected, while historical comments are left original.

§1. Introduction

Thurston constructed codimension-one foliations of S^3 which are non-cobordant and showed that there exists a surjective homomorphism from $H_3(B\Gamma_1, \mathbb{Z})$ to $\mathbb{R}$ in [2]. The homomorphism is given by the integration of the Godbillon–Vey form of foliations over manifolds. The Godbillon–Vey forms are also defined for foliations of codimension greater than one, and it has been conjectured that an analogue also holds. A simple adaptation of constructions in codimension-one case does not work in higher codimensional case, however, there still exists a surjective homomorphism from $H_{2n+1}(B\Gamma_n, \mathbb{Z})$ to $\mathbb{R}$. Indeed, Thurston showed the following

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