

Accepted Manuscript

Existence and uniqueness of weak moment maps in multisymplectic geometry

Jonathan Herman

PII: S0393-0440(18)30285-7

DOI: <https://doi.org/10.1016/j.geomphys.2018.05.001>

Reference: GEOPHY 3208

To appear in: *Journal of Geometry and Physics*

Received date: 14 November 2017

Revised date: 19 March 2018

Accepted date: 2 May 2018

Please cite this article as: J. Herman, Existence and uniqueness of weak moment maps in multisymplectic geometry, *Journal of Geometry and Physics* (2018), <https://doi.org/10.1016/j.geomphys.2018.05.001>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Existence and Uniqueness of Weak Homotopy Moment Maps

Jonathan Herman

Department of Pure Mathematics, University of Waterloo
 j3herman@uwaterloo.ca

Abstract

We show that the classical results on the existence and uniqueness of moment maps in symplectic geometry generalize directly to weak homotopy moment maps in multisymplectic geometry. In particular, we show that their existence and uniqueness is governed by a Lie algebra cohomology complex which reduces to the Chevalley-Eilenberg complex in the symplectic setup.

Contents

1	Introduction	2
2	Cohomology	4
2.1	Group Cohomology	4
2.2	Lie Algebra Cohomology	5
3	Multisymplectic Geometry	7
3.1	Multisymplectic Manifolds	7
3.2	Hamiltonian forms	8
3.3	Weak Homotopy Moment Maps	8
4	Equivariance of Weak Moment Maps	9
4.1	Equivariance in Multisymplectic Geometry	9
4.2	Infinitesimal Equivariance in Multisymplectic Geometry	13
5	Existence of Not Necessarily Equivariant Weak Moment Maps	14
6	Obtaining an Equivariant Moment Map from a Non-Equivariant Moment Map	17
7	Uniqueness of Weak moment Maps	18
8	Weak moment Maps as Morphisms	18
9	Open Questions	20

1 Introduction

Recall that for a symplectic manifold (M, ω) , a Lie algebra \mathfrak{g} is said to act symplectically if $\mathcal{L}_{V_\xi} \omega = 0$, for all $\xi \in \mathfrak{g}$, where V_ξ is its infinitesimal generator. A symplectic group action is called Hamiltonian if one can find a moment map, that is, a map $f : \mathfrak{g} \rightarrow C^\infty(M)$ satisfying

$$df(\xi) = V_\xi \lrcorner \omega,$$

Download English Version:

<https://daneshyari.com/en/article/8255349>

Download Persian Version:

<https://daneshyari.com/article/8255349>

[Daneshyari.com](https://daneshyari.com)