

Accepted Manuscript

An introduction to associative geometry with applications to integrable systems

Alberto Tacchella



PII: S0393-0440(16)30268-6
DOI: <http://dx.doi.org/10.1016/j.geomphys.2016.09.013>
Reference: GEOPHY 2863

To appear in: *Journal of Geometry and Physics*

Received date : 27 June 2016
Revised date : 26 September 2016
Accepted date : 29 September 2016

Please cite this article as: A. Tacchella, An introduction to associative geometry with applications to integrable systems, *Journal of Geometry and Physics* (2016), <http://dx.doi.org/10.1016/j.geomphys.2016.09.013>

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.

An introduction to associative geometry with applications to integrable systems

Alberto Tacchella*

November 7, 2016

Abstract

The aim of these notes is to provide a reasonably short and “hands-on” introduction to the differential calculus on associative algebras over a field of characteristic zero. Following a suggestion of Ginzburg’s we call the resulting theory *associative geometry*. We argue that this formalism sheds a new light on some classic solution methods in the theory of finite-dimensional integrable dynamical systems.

Contents

1	Introduction	2
2	Differential calculus on associative algebras	4
2.1	Kähler differentials	4
2.2	The complex $\Omega^\bullet(A)$	7
2.3	The Karoubi-de Rham complex	11
2.4	Associative affine space	14
2.5	The Quillen complex	17
2.6	Relative differential forms	18
2.7	Quiver path algebras	19
3	Representation spaces	22
3.1	Representation spaces and their quotients	22
3.2	The correspondence between the associative and the commutative worlds	25
3.3	Quiver representation spaces	29
4	Associative symplectic geometry and applications	31
4.1	Symplectic structures on associative varieties	31
4.2	Some examples of associative symplectic varieties	33
4.3	Free motion on the associative plane and the rational Calogero-Moser system . .	36
4.4	Other systems obtained from motions on the associative plane	39
4.5	Integrable systems related to quiver varieties	41

*Dipartimento di Matematica, Università di Genova, Via Dodecaneso 35, 16146 Genova, Italy. E-mail address: altacch@gmail.com

Download English Version:

<https://daneshyari.com/en/article/5500068>

Download Persian Version:

<https://daneshyari.com/article/5500068>

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