Mathematics > Quantum Algebra

Poisson algebras, Weyl algebras and Jacobi pairs

Yucai Su

(Submitted on 6 Jul 2011 (v1), last revised 31 Oct 2011 (this version, v9))

We study Jacobi pairs in details and obtained some properties. We also study the natural Poisson algebra structure $(\PP,[...,...],...)$ on the space $\PP:=\C [y]((x^{-\frac1N}))$ for some sufficient large N, and introduce some automorphisms of $(\PP,[...,...],...)$ which are (possibly infinite but well-defined) products of the automorphisms of forms $e^{\ad_H}$ for $H\in x^{1-\frac1N}\C[y][[x^{-\frac1N}]]$ and $\tau_c:(x,y)\mapsto(x,y-cx^{-1})$ for some $c\in\C$. These automorphisms are used as tools to study Jacobi pairs in $\PP$. In particular, starting from a Jacobi pair (F,G) in $\C[x,y]$ which violates the two-dimensional Jacobian conjecture, by applying some variable change $(x,y)\mapsto\big(x^{b},x^{1-b}(y+a_1 x^{-b_1}+...+a_kx^{-b_k})\big)$ for some $b,b_i\in\Q_+,a_i\in\C$ with $b_i<1<b$, we obtain a \QJ pair still denoted by (F,G) in $\C[x^{\pm\frac1N},y]$ with the form $F=x^{\frac{m}{m+n}}(f+F_0)$, $G=x^{\frac{n}{m+n}}(g+G_0)$ for some positive integers m,n, and $f,g\in\C[y]$, $F_0,G_0\in x^{-\frac1N}\C[x^{-\frac1N},y]$, such that F,G satisfy some additional conditions. Then we generalize the results to the Weyl algebra $\WW=\C[v]((u^{-\frac1N}))$ with relation $[u,v]=1$, and obtain some properties of pairs (F,G) satisfying $[F,G]=1$, referred to as Dixmier pairs.

Comments:	arXiv admin note: substantial text overlap with arXiv:math/0512268
Subjects:	**Quantum Algebra (math.QA)**; Mathematical Physics (math-ph); Commutative Algebra (math.AC); Algebraic Geometry (math.AG); Rings and Algebras (math.RA)
MSC classes:	17B63, 14R15, 14E20, 13B10, 13B25
Cite as:	**arXiv:1107.1115 [math.QA]**
	(or **arXiv:1107.1115v9 [math.QA]** for this version)

Submission history

From: Yucai Su [view email]
[v1] Wed, 6 Jul 2011 12:55:42 GMT (42kb)
[v2] Thu, 7 Jul 2011 16:08:25 GMT (43kb)
[v3] Wed, 27 Jul 2011 19:38:19 GMT (46kb)
[v4] Wed, 3 Aug 2011 16:55:44 GMT (50kb)
[v5] Fri, 19 Aug 2011 09:12:55 GMT (54kb)

[v6] Tue, 30 Aug 2011 15:33:59 GMT (58kb)
[v7] Tue, 27 Sep 2011 07:39:11 GMT (63kb)
[v8] Wed, 12 Oct 2011 17:40:30 GMT (61kb)
[v9] Mon, 31 Oct 2011 07:24:41 GMT (68kb)

Which authors of this paper are endorsers?