Comment on a Paper by Yucai Su On Jacobian Conjecture

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Abstract

The said paper [Su] entitled "Proof Of Two Dimensional Jacobian Conjecture" is with gaps.

Comments

J. Lipman sent us the URL of [2]. Harley Flanders of Michigan mentioned that: "*I would be very much interested in your opinions of Su's paper.*"

We have browsed Su's paper. There are at least 2 errors. (1): The author relied on the computations over a non-existing entity, *the associative algebra* $\mathbf{F}[x,y][[y^{-1}]]$ (cf pg 5 of [2]). It is easy to see that if such a thing exists, we must have

$$1 + yy^{-1} + \cdots + y^i y^{-i} + \cdots = 1 + 1 + \cdots + 1 + \cdots$$

This is impossible. What the author really means is the ring $K[x]((y^{-1}))$, the ring of meromorphic functions over $K[x]$. The author should make the substitutions throughout his paper.

(2): The author first use an (tame) automorphism $x \mapsto x + y^k, y \mapsto y$ to satisfy the condition that $f_0(x), g_0(x) \in F^*$ (on pg 7) (note that the degrees are increased), then use the same kind automorphism to reduce the degrees (on pg 15). This is a cyclic argument. The degrees may not be reduced.

Suggestions to Yucai Su

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We think that the author is making a noble attempt to solve a hard problem. The author should make the substitution mentioned in (1) above and consult the article [1] (in there, $\tau = F(x,y)^{-1/m}$ in Su's notation). To avoid a cyclic argument, one should use a general linear transformation instead of an (tame) automorphism $x \mapsto x+y^k, y \mapsto y$ at the beginning. For the last thirty years, the only case one can not handle is the case of "more than one point at ∞", i.e., in Su's notation, $p = 1, j = m+n-2$ (cf pg 17, Subcase of [2]), all other cases are well-known. The author should give a convincing argument for this case (in fact, for this case only).

Reference

[1] **Moh, T.T.**: *On the Jacobian Conjecture* Crelle 1983.

[2] **Su, Yucai** *Proof Of Two Dimensional Jacobian Conjecture* Arxiv, Dec 18, 2005,