# GLOBAL INJECTIVITY OF POLYNOMIAL MAPS VIA VECTOR FIELDS

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**Abstract.** This paper deals with the Real Jacobian Problem (RJP ) and the Markus Yamabe Conjecture (MYC) for polynomial vector fields. We prove injectivity for a big subclass of vector fields. Concerning the MYC we get some partial results also for a big subclass of polynomial vector fields.

## 1. Introduction and statement of the results

Given a differentiable map $X : \mathbb{R}^n \longrightarrow \mathbb{R}^n$, denote by $JX(x)$ the jacobian matrix of $X$ at the point $x \in \mathbb{R}^n$. The Inverse Mapping Theorem implies that if $\det JX(x) \neq 0$ at $x$ then $X$ is a local diffeomorphism at $x$.

We denote by $\mathcal{X}_m$ the set of all polynomial maps $X = (P^1, \ldots, P^n) : \mathbb{R}^n \longrightarrow \mathbb{R}^n$ such that $\deg(P^i) \leq m$. By identifying $\mathcal{X}_m$ with $\mathbb{R}^M$, where $M$ is the number of all coefficients of $P^1, \ldots, P^n$, we endow $\mathcal{X}_m$ with the so called coefficient topology. Notice that each $X \in \mathcal{X}_m$ can be considered as a polynomial map or as a vector field.

Partially supported by the DGICYT grant Number PB930860



*A. van den Essen (ed.). Automorphisms of Affine Spaces,* 105–123.