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Automorphism group of a general Lie algebra and Jacobian Conjecture I. Preliminary report.

It is well known that the Jacobian conjecture holds on the polynomial ring $\mathbb{F}[x]$. It is also well known that if the automorphism groups of Weyl algebras or the Witt algebras are known, then we can know the validity of the Jacobian conjecture. In this work, we find the automorphism group of the general Lie algebra $W^+(2)$. We also prove that every non-zero endomorphism of the algebra $W^+(2)$ is surjective in this work. This implies that the Jacobian conjecture holds on the polynomial ring $\mathbb{F}[x, y]$. Since the special type Lie algebra $S^+(3)$ has two ad-diagonal elements, we can find the automorphism group of the Lie algebra $S^+(3)$ as $W^+(2)$. (Received July 29, 2014)