International Electronic Journal of Algebra
Volume * (2020) **-**

A CASIMIR ELEMENT INEXPRESSIBLE AS A LIE POLYNOMIAL

Rafael Reno S. Cantuba

Received: 11 June 2019; Revised: 03 October 2020; Accepted 13 October 2020
Communicated by Sait Halicioglu

Abstract. Let q be a scalar that is not a root of unity. We show that any nonzero polynomial in the Casimir element of the Fairlie-Odesskii algebra $U_q'(\mathfrak{so}_3)$ cannot be expressed in terms of only Lie algebra operations performed on the generators I_1, I_2, I_3 in the usual presentation of $U_q'(\mathfrak{so}_3)$. Hence, the vector space sum of the center of $U_q'(\mathfrak{so}_3)$ and the Lie subalgebra of $U_q'(\mathfrak{so}_3)$ generated by I_1, I_2, I_3 is direct.

Mathematics Subject Classification (2020): 17B60, 16S15, 17B37, 81R50
Keywords: Lie polynomial, Casimir element, quantum group, quantum algebra

Rafael Reno S. Cantuba
Mathematics and Statistics Department
College of Science
De La Salle University, Manila
2401 Taft Ave., Malate, Manila, 1004 Metro Manila, Philippines
e-mail: rafael_cantuba@dlsu.edu.ph