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$U_q(sl(m+1))$ -Module Algebra Structures on the Coordinate Algebra of a Quantum Vector Space

We study the module-algebra structures of $U_q(sl(m+1)) = \mathcal{H}(e_i, f_i, k_i^{\pm 1})_{1 \leq i \leq m}$ on the coordinate algebra of quantum vector spaces are studied. We denote the coordinate algebra of quantum n -dimensional vector space by $A_q(n)$. As our main result, first, we give a complete classification of module-algebra structures of $U_q(sl(m+1))$ on $A_q(3)$ when $k_i \in \text{AutL}(A_q(3))$ as actions on $A_q(3)$ for $i = 1, \dots, m$ and $m \geq 2$ and with the same method, on $A_q(2)$, all module-algebra structures of $U_q(sl(m+1))$ are characterized. Lastly, the module-algebra structures of $U_q(sl(m+1))$ on $A_q(n)$ are obtained for any $n \geq 4$.

Keywords: Quantum enveloping algebra, coordinate algebra of quantum vector space, Hopf action, module algebra, weight.

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