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On the Polynomial Realization of the Reduced W -Algebra $U_\chi(\mathfrak{sl}_2, e)$

We study the structure of the reduced W -algebra $U_\chi(\mathfrak{sl}_2, e)$ with e being regular nilpotent, over an algebraically closed field k of characteristic $p > 2$. As a consequence, we give a description of the center of the reduced enveloping algebra $U_\chi(\mathfrak{sl}_2)$.

Keywords: Center, regular nilpotent, reduced W -algebra, reduced enveloping algebra.

MSC: 17B50, 17B05, 17B35.