

# $Q$ -graded Hopf quasigroups

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**Abstract.** Firstly, we introduce a class of new algebraic systems which generalize Hopf quasigroups and Hopf  $\pi$ -algebras called  $Q$ -graded Hopf quasigroups, and research some properties of them. Secondly, we define the representations of  $Q$ -graded Hopf quasigroups, i.e  $Q$ -graded Hopf quasimodules, research the construction method and fundamental theorem of them. Thirdly, we research the smash products of  $Q$ -graded Hopf quasigroups.

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