



## Proceedings Symmetries in Yetter-Drinfel'd-Long categories

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Abstract: Symmetric categories have been of great interest in quantum algebra and mathematical physics. Cohen and Westreich in 1998 studied symmetries in the Yetter-Drinfel'd category over a Hopf algebra under some conditions. Pareigis in 2001 found the necessary and sufficient condition for \$\!^{H}\_{H}\_{H}\mathcal{YD}\$ to be symmetric. Later, Panaite et al. in 2010 proposed the definition of pseudosymmetric braided categories which can be viewed as a kind of weakened symmetric braided categories, and showed that the category \$\!\_{H}\mathcal{YD}^{H}\$ is pseudosymmetric if and only if is commutative and cocommutative. Let \$H\$ be a Hopf algebra and \$\mathcal{LR}(H)\$ the category of Yetter-Drinfel'd-Long bimodules over \$H\$. We first show that the Yetter-Drinfel'd-Long category \$\mathcal{LR}(H)\$ is symmetric if and only if \$H\$ is trivial in four different methods, and that \$\mathcal{LR}(H)\$ is pseudosymmetric if and only if \$H\$ is commutative. We then introduce the definition of the \$u\$-condition in \$\mathcal{LR}(H)\$ and give a necessary and sufficient condition for \$H\_{i}\$ \$(i=1,2,3,4)\$ to satisfy the \$u\$-condition. Then we study the relation between the \$u\$-condition and the symmetry of \$\mathcal{LR}(H)\$.

Keywords: symmetric category, Yetter-Drinfel'd-Long category, the \$u\$-condition, pseudosymmetry

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