

**Title:**  $(m, n)$ -Hom-Lie algebras

**Author(s):** Tianshui Ma and Huihui Zheng

Let  $(H, \beta)$  be a monoidal Hom-Hopf algebra, and  $(A, \alpha)$  an algebra in the  $(m, n)$ -Hom-Yetter–Drinfeld category  $\tilde{\mathcal{H}}(\frac{H}{H}\mathcal{YD}(\mathcal{Z}))$ , where  $m, n \in \mathcal{Z}$  (the set of integers). In this paper, we introduce the notion of  $(m, n)$ -Hom-Lie algebra (i.e., Lie algebras in the category  $\tilde{\mathcal{H}}(\frac{H}{H}\mathcal{YD}(\mathcal{Z}))$ ), and then prove that  $(A, \alpha)$  can give rise to an  $(m, n)$ -Hom-Lie algebra with suitable Lie bracket when the braiding  $\tau$  in  $\tilde{\mathcal{H}}(\frac{H}{H}\mathcal{YD}(\mathcal{Z}))$  is symmetric on  $(A, \alpha)$ . We also show that if also  $(A, \alpha)$  is a sum of two  $(H, \beta)$ -commutative Hom-subalgebras, then  $[A, A][A, A] = 0$ .

**Address:**

Tianshui Ma  
Department of Mathematics and  
Henan Engineering Laboratory  
for Big Data Statistical Analysis  
and Optimal Control  
School of Mathematics  
and Information Science  
Henan Normal University  
Xinxiang 453007  
China

**Address:**

Huihui Zheng  
Department of Mathematics  
School of Mathematics  
and Information Science  
Henan Normal University  
Xinxiang 453007  
China