Abstract

The Gaussian CEO problem is a crucial joint-source coding (JSC) problem in distributed source coding (DSC) category. Although it has been studied for over two decades, researchers are still keen to make improvements. This research aims at solving the Gaussian CEO problem by combing Wyner-Ziv coding and convolutional lattice codes. The Wyner-Ziv coding scheme aims at compressing the source with the help of side information. In addition, the side information can be easily determined by using the cosets of the lattices. There are several classic lattices, such as the E_8 lattices and Barnes-Wall lattices, which are already known to researchers. However, such lattices have very strict structures, setting obstacles for researchers to use. Moreover, there always exists a huge gap between the Normalized Second Moment (error-correcting ability) and the theoretical bound. Therefore, convolutional code lattices are proposed, providing better Normalized Second Moment and flexibility for structures compared to classic lattices. However, there is not much research on combing them. Thus this work combines the Wyner-Ziv coding and convolutional code lattices to solve the Gaussian CEO problem. The simulation results show that convolutional lattice codes outperform classic lattice codes for the considered model.

Keywords: the Gaussian CEO problem, convolutional lattice code, rate-distortion function, Wyner-Ziv coding