Improved Multi-Channel Separation Algorithm for Satellite-Based Automatic Identification System Signals Based on Artificial Bee Colony and Adaptive Moment Estimation

Authors : Peng Li, Luan Wang, Haifeng Fei, Renhong Xie, Yibin Rui, Shanhong Guo

Abstract : The applications of satellite-based automatic identification system (S-AIS) pave the road for wide-range maritime traffic monitoring and management. But the coverage of satellite's view includes multiple AIS self-organizing networks, which leads to the collision of AIS signals from different cells. The contribution of this work is to propose an improved multi-channel blind source separation algorithm based on Artificial Bee Colony (ABC) and advanced stochastic optimization to perform separation of the mixed AIS signals. The proposed approach adopts modified ABC algorithm to get an optimized initial separating matrix, which can expedite the initialization bias correction, and utilizes the Adaptive Moment Estimation (Adam) to update the separating matrix by adjusting the learning rate for each parameter dynamically. Simulation results show that the algorithm can speed up convergence and lead to better performance in separation accuracy.