

# Using a Hybrid Evolutionary Algorithm for Solving Signal Transmission Station Location and Allocation Problem with Different Regional Communication Quality Restriction

Ta-Cheng Chen<sup>1,2,\*</sup>, Sheng-Chuan Wang<sup>3</sup>, Wen-Cheng Tseng<sup>2</sup>

<sup>1</sup>Department of M-Commerce and Multimedia Applications, Asia University, Taichung, Taiwan

<sup>2</sup>Department of Information Management, National Formosa University, Yunlin, Taiwan

<sup>3</sup>Department of Finance, Asia University, Taichung, Taiwan

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## Abstract

This study aims to investigate the signal transmission station location-allocation problems with the various restricted regional constraints. In each constraint, the types of signal transmission stations and the corresponding numbers and locations are to be decided at the same time. Inappropriate set up of stations is not only causing the unnecessary cost but also making the poor service quality. In this study, we proposed a hybrid evolutionary approach integrating the immune algorithm with particle swarm optimization (IAPSO) to solve this problem where each of the regions is with different maximum failure rate restrictions. We compared the performance of the proposed method with commercial optimization software LINGO®. According to the experimental results, solutions obtained by our IAPSO are better than or as well as the best solutions obtained by LINGO®. It is expected that our research can provide the telecommunication enterprise the optimal/near-optimal strategies for the setup of signal transmission stations.

**Keywords:** location-allocation problem, hybrid evolutionary approach, immune algorithm, particle swarm optimization

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\* Corresponding author. E-mail address: [tchen@nfu.edu.tw](mailto:tchen@nfu.edu.tw)

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