

## Optimal capacitors appointment though immune multi-objective algorithm

T. L. Huang<sup>1\*</sup>

C. M. Tsai<sup>2†</sup>

T. Y. Hwang<sup>1</sup>

C. C. Huang<sup>4</sup>

Y. N. Lien<sup>3</sup>

C. R. Chen<sup>4</sup>

C. H. Chang<sup>1‡</sup>

<sup>1</sup> Computer Science Department  
National Taipei University of Education  
Taiwan, R.O.C.

<sup>2</sup> Department of Electrical Engineering  
Chang-Gung University  
Taiwan, R.O.C.

<sup>3</sup> Computer Science Department  
National Chengchi University  
Taiwan, R.O.C.

<sup>4</sup> Department of Electrical Engineering  
National Taipei University of Technology  
Taiwan, R.O.C.

---

### Abstract

This work proposes a two-stage immune algorithm that embeds the compromise programming to perform multi-objective optimal compensator placement. A new problem formulation model that involves fuzzy sets to reflect the imprecise nature of objectives and incorporates multiple planning requirements is presented. The proposed approach finds a set of non-inferior (Pareto) solutions rather than any single aggregated optimal solution. Additionally, this developed approach eliminates the need for any user-defined weight factor to aggregate all objectives. Comparative studies are conducted on an actual system with encouraging results, demonstrating the effectiveness of the proposed approach.

---

**Keywords and phrases :** *Compensator placement, immune algorithm, non-inferior set, compromise programming.*

---

\*E-mail: [tsongliang@tea.ntue.edu.tw](mailto:tsongliang@tea.ntue.edu.tw)

†E-mail: [cmtsai@mail.tnu.edu.tw](mailto:cmtsai@mail.tnu.edu.tw)

‡E-mail: [chihhan@ieee.org](mailto:chihhan@ieee.org)

---

*Journal of Information & Optimization Sciences*

Vol. 31 (2010), No. 5, pp. 973–992

© Taru Publications