Improved Grey Wolf Optimization Algorithm for Overcurrent Relays Coordination

Noor Zaihah Jamal1, Mohd Herwan Sulaiman2, Omar Aliman3 and Zuriani Mustaffa4, Mohd Wazir Mustafa5

1,2,3Faculty of Electrical & Electronics Engineering
4Faculty of Computer System & Software Engineering
Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia
5 Faculty of Electrical Engineering, Universiti Teknologi Malaysia, Balai Cerap UTM, Lengkok Suria, 81310 Skudai, Johor
1 zaihah@ump.edu.my , 2 mherwan@ieee.org , 3 omaraliman@ump.edu.my , 4 zuriani@ump.edu.my , 5 wazir@utm.my

Abstract
Recently, nature inspired algorithms (NIA) have been implemented to various fields of optimization problem such as biomedical engineering, electrical engineering, computer science and etc. The achievement of NIA in solving optimization in these fields becoming the motivation to apply one of the NIA namely Grey Wolf Optimizer (GWO) into overcurrent relay coordination problem. However, the current state of GWO suffers lack of exploration problem. Hence, the improvement of GWO has been proposed in this paper to enhance the exploration of original GWO. The improvement of GWO (IGWO) is implemented in finding the the optimal value of the Time Multiplier Setting (TMS) and Plug Setting (PS) in order to minimize the primary relays' operating time at the near end fault. Comprehensive simulation studies have been performed to demonstrate the reliability and efficiency of the proposed modification technique compared to the original GWO. The generated results have confirmed the proposed IGWO is able to improve the objective function of the overcurrent relay coordination problem.

Keyword – Time multiplier setting; plug setting; grey wolf optimization algorithm; overcurrent relay coordination