International Journal of Hydrogen Energy
Volume 48, Issue 52, 22 June 2023, Pages 20028-20040

Improved fish migration optimization method to identify PEMFC parameters

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https://doi.org/10.1016/j.ijhydene.2023.02.071

Abstract

In a worldwide environment context where the emergency need to decrease pollutant emissions is an important issue, the research for solutions is increasing. Fuel cell technology is anticipated to become a practicable approach for solving the problem of pollution due to its environmentally friendly characteristics. In this work, a novel problem formulation is suggested for the efficient recognition of PEMFC parameters which the solving is by using the Improved Fish Migration Optimizer (IFMO) technique. After coding the steps of the algorithm in MATLAB, the objective function is resolved for the fuel cell. Comprehensive simulations evaluate the formulation performance with the suggested and traditional objective functions; then, the outcomes are compared. To confirm the suggested formulation ascendancy compared to the traditional curve-fitting method, a complete assessment based on convergence rate, the value of the objective function, and the value of absolute voltage error are performed. The achieved value of the objective function, absolute voltage error, and average time of computation is 0.005, 0.4, and 1.63, respectively. Environmentally, the combustion of hydrogen and its use in PEMFC produce no carbon dioxide.