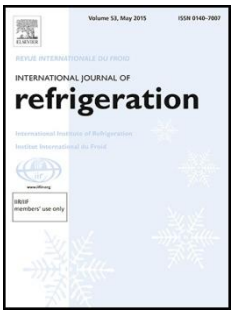
Accepted Manuscript



Title: Optimal Design and Analysis of Mechanical Draft Cooling Tower Using Improved Jaya Algorithm

Author: R.V. Rao, K.C. More

PII: S0140-7007(17)30258-X
DOI: http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.06.024
Reference: JIJR 3689

To appear in: *International Journal of Refrigeration*

Received date: 13-2-2017
Revised date: 10-4-2017
Accepted date: 19-6-2017

Please cite this article as: R.V. Rao, K.C. More, Optimal Design and Analysis of Mechanical Draft Cooling Tower Using Improved Jaya Algorithm, *International Journal of Refrigeration* (2017), http://dx.doi.org/doi: 10.1016/j.ijrefrig.2017.06.024.

Optimal Design and Analysis of Mechanical Draft Cooling Tower Using Improved Jaya Algorithm

R. V. Rao*, K. C. More
Dept. of Mech.Engg., S.V. National Institute of Technology, Surat-395007, India
(Corresponding author: - ravipudirao@gmail.com, Tel- +912612201982)*

Highlights

- Improved Jaya algorithm is proposed for design of mechanical draft cooling tower.
- Results of the proposed algorithm are comparatively much better.
- The algorithm's performance is superior in terms of time and convergence.

Abstract:

A Cooling tower is an imperative component of industrial plants. The minimization of energy related expenses is critical for conservation of resources and energy savings. Hence, the present study explores the use of an improved Jaya algorithm called self-adaptive Jaya algorithm for optimal design of cooling tower from economic facets. In this work, six different examples are considered in the design optimization of mechanical draft cooling tower. Various researchers have attempted the same mathematical models by using different methods like Merkel method, Poppe method and artificial bee colony (ABC) algorithm. The results achieved by using the proposed self-adaptive Jaya algorithm are compared with the results achieved by using the Merkel method, Poppe method, ABC algorithm and basic Jaya algorithm. The proposed self-adaptive Jaya algorithm determines the population size automatically and the user need not tune the population size. The proposed self-adaptive Jaya algorithm is proved better as compared to the other optimization methods with respect to achieving the optimal value of the objective function at less computational effort.