Proceedings International
Platinum Open Access Journal (ISSN 2668-6384)

Proceedings, Abstract
Volume 3, Issue 2, 2021, 22 - 23
https://doi.org/10.33263/Proceedings32.022023

Optimizing Engineering Problems from Nature Inspired Techniques †

Rama Rao Karri [1,*]

[1] Faculty of Engineering, Universiti Teknologi Brunei, Brunei Darussalam;
* Correspondence: kramarao.iitd@gmail.com (R.R.K.);
† Presented at Virtual International Conference on Physical Sciences (ICPS - 2021)
Received: 1.02.2021; Revised: 3.02.2021; Accepted: 4.02.2021; Published: 5.02.2021

Abstract: For every problem in our daily life, we can derive a solution from nature. From health to engineering, there is a path or a solution to solve the issue. Nature has always inspired many scientists/researchers to mimic their phenomena to solve various engineering problems. From a small ant to a big whale, mimicking of creatures has led scientists to develop advanced machines and robust prototypes. On similar footprints, nature-inspired optimization techniques have been developed and successfully applied in every field of engineering. In the field of engineering and applied sciences, the process involved is modeled using numerical models, which represent the mechanism and inherent characteristics of the system. These models can be simple/complex/non-linear/high dimensional, and the efficacy of these models depends on the accurate evaluation of process parameters. Therefore, the optimization techniques will be handy to evaluate the process parameters that identify the global minima in the search domain as optimization is an art of science that investigates the best estimation of the decision variables of a complex problem that may originate under a definite condition. This procedure identifies the optimal parameter values that minimize/maximize an objective function depending on the conditions and limitations. Implementation of optimization to real-time problems is very challenging to solve, and often these applications need to be dealt with non-deterministic approaches. To evaluate the performance of nature-inspired techniques like differential evolution (DEO), ant colony optimization (ACO), particle swarm optimization (PSO), different real-time processes in Chemical and Environmental systems were chosen, and these techniques were applied to the complex non-linear systems. The need for optimization and their performances are discussed in this presentation.
Indole is one of the most ubiquitous heterocycles found in nature. Owing to significant biological activities, indole has become an important component in many pharmaceutical agents. Consequently, their preparation has been a major area of research for well over a hundred years. Recently, C−H functionalization reactions have become one of the most attractive strategies to produce this *N*-containing heterocycle in a step and atom economic route. Herein, we majorly focussed on the synthesis of indoles *via* inter and intramolecular Fujiwara-Moritani type reactions.

Keywords: differential evolution; ant colony optimization; particle swarm optimization; different real-time processes.

Funding

This research received no external funding.

Acknowledgments

This research has no acknowledgment.

Conflicts of Interest

The authors declare no conflict of interest.