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A Brief Review of PV-Wind Based Distribution Generation Optimization Techniques

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Abstract

By correctly positioning distributed generators (DG) in the optimum place, power quality and depend ability of distributed power can be achieved.

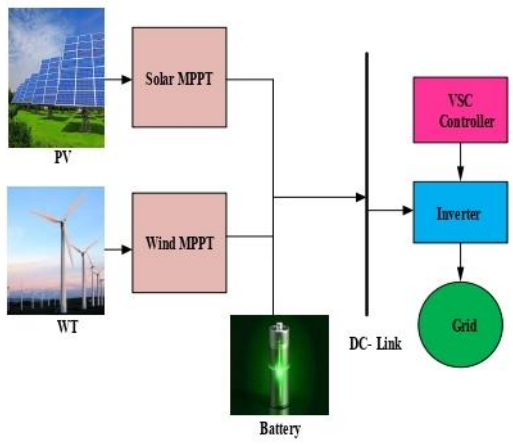
The integration of distributed generation was primarily increasing the necessity of optimization tools. This essay offers several reviews of current optimization methods that have been applied to DG unit p roblem-solving and sizing over the years.

In contrast, this study examines the constantly expanding interest in the integration of distributed gene ration by overcoming all of the economic, technological, environmental, etc.

Renewable Energy Sources (RES) are inexhaustible, clean, and free from pollution so they are considered widely rather than fossil fuels in distributed generation

REVIEW OF OPTIMIZATION TECHNIQUES

Block Diagram of PV-Wind Grid-connected System



A literature survey of various optimization techniques utilized in distribution generation for various applications like maximum power tracking from renewable energy sources as these sources is intermittent [1]. The optimal location of distributed generation and various technical issues can be resolved [2].

Perturb and Observe MPPT Technique

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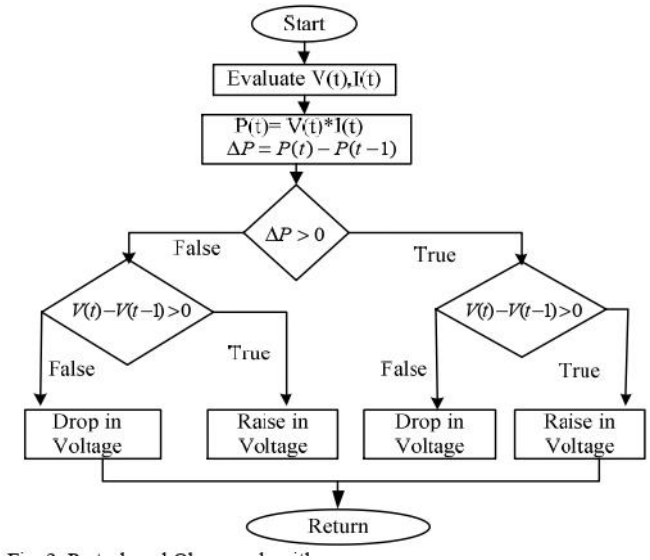
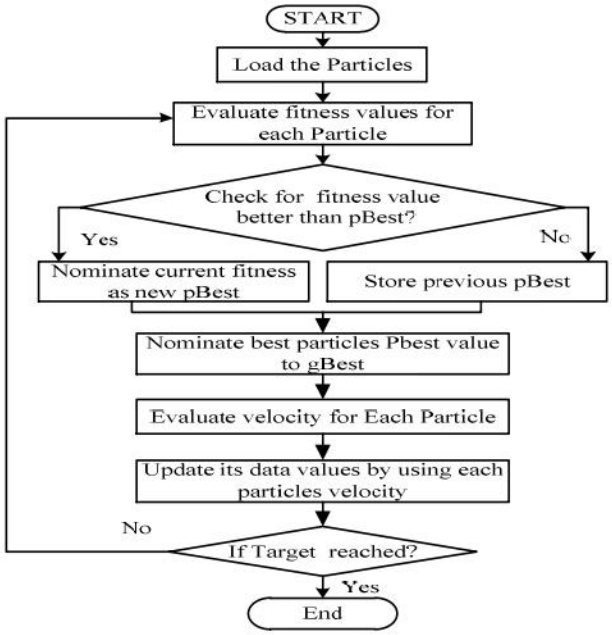


Particle Swarm Optimization Technique

PSO is an intelligent technique majorly used for evaluating optimization which functions on the movement ofswarms [3]. Problem-solving such as social communication is applied using PSO shown in Fig. 3. It utilizes several particlesthat constitute swarms moving in a specified search space to track the best solution [4]. Each particle tries to track its neighboring particles in the search space which is accomplished with the best solution P_{best}. PSO tracks other best values among the best values obtained which are called global best G_{best}. Both the G_{best} and P_{best} are saved and determined by the following velocity function [5].



Cuckoo search algorithm

Generally, based on the topic to be computed, this algorithm operates on random searches in the quest area [6]. Thesearch is usually not random, but there is a function in the algorithm that offers

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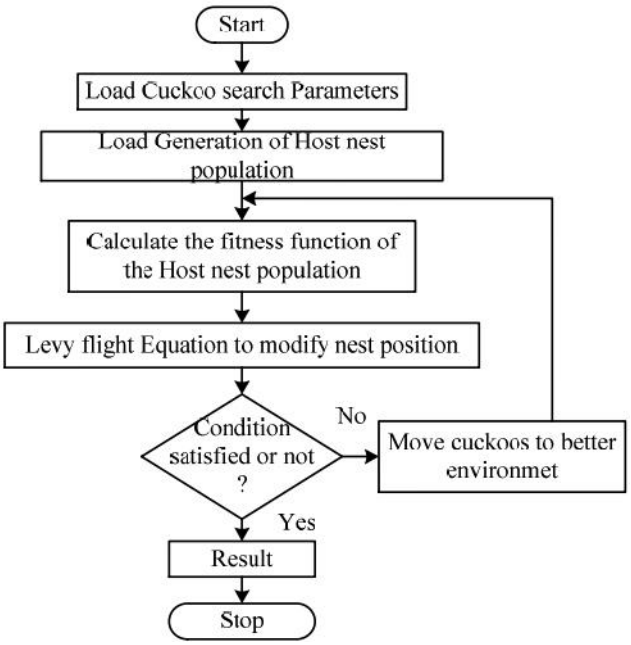
instructions during the search such that iterations boost the outcome. Two basic characteristics of this algorithm are exploitation and discovery [7]. During initialization, the voltage, current, power, and number ofvariables are set to a value. The power that is evaluated has fitness and stored by measuring the current values of voltageand current [8]. It repeats every time the convergence is reachedby testing the samples if the evaluated power is not containedin the fitness array. until the best solution is obtained the process repeats[9].



Genetic Algorithm

It is a natural computational procedure that is considered to prove the optimization problems so it is generally known as a heuristic search algorithm. It is initialized from a set of the population with N, size in which every individual regulates a point in search space and thus their solution is called chromosome which indicates a list of genes [10]. Selection, crossover, and mutation are the three operators are used to compute the genetic composition [11]. During each cycle, a new generation that has the highest fitness function with the best solution is produced from the existing population during the selection process [12]. Cross over operator produces two offspringby rejoining the information from two parents. Gene values in individuals are changed using a random process using mutation [13]. The allele of each gene is a candidate for mutation,and the function is determining by mutation. Until the optimization criteria are reached the process keeps on repeating [14].

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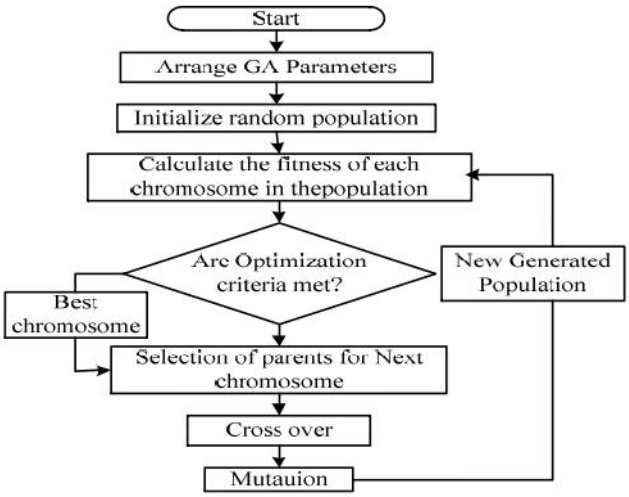
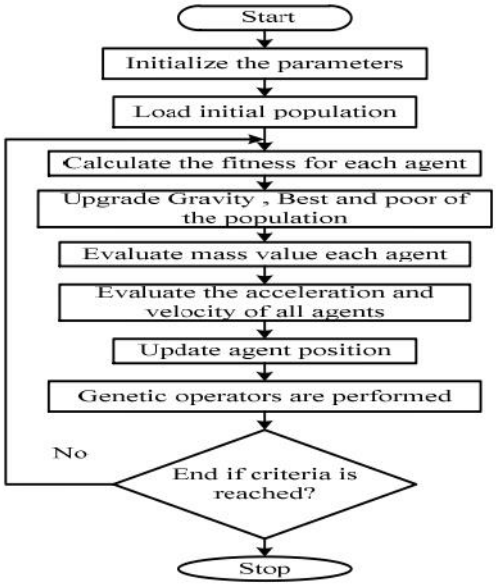
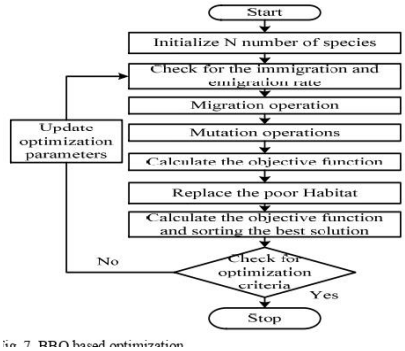


Gravitational Search



Biogeography Based optimization



Grey Wolves algorithm

Apex hunters are commonly called Gray Wolves, which means they are at the top of the

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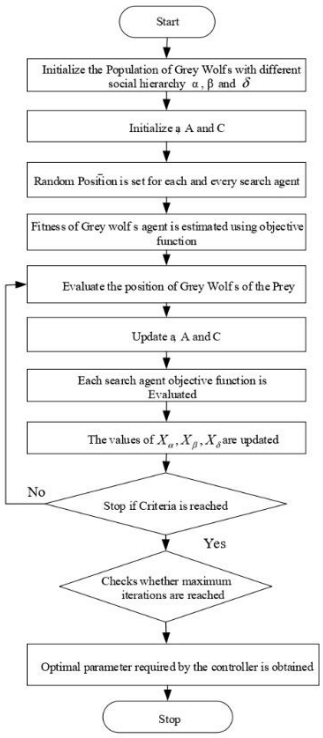
food chain. In general, they live in groups of an average size of 5-12 and have a rigid hierarchy of social superiority [15]. Generally, they are divided into three levels: first level: alpha, second level: beta, lower level: omega,



conclusion

proposes the review of the various existing and recent MPPT to the application of the grid integration. This paper presents the review and contribution about the application of various optimization techniques

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