

African Buffalo Optimization Algorithm for Tuning Parameters of a PID Controller in Automatic Voltage Regulators

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Abstract — In this paper, we present the African Buffalo Optimization (ABO) approach for the metaheuristic tuning of the Proportional, Integral & Derivative (PID) Controller parameters of Automatic Voltage Regulators in electrical power generation and transmission. ABO simulates the movement of African Buffalos as they migrate from place to place all over Africa in search of grazing pastures. The buffalos use just two basic vocalizations, namely the waaa and the maaa to organize the entire herd in their migration and search for food and water. Though a recently-designed algorithm, the ABO has been effective and efficient in solving a number of search optimization problems. The highpoints of the ABO include its use of few parameters, constant interactions among the buffalos and the deployment of the exploration and exploitations mechanisms of the algorithm in every iteration. The simulation outcome of the application of ABO to tune the parameters of a PID-Controller parameters of Automatic Voltage Regulators has been very competitive when compared similar outcomes of other metaheuristics tuners: BFO-PID, PSO-PID, GA-PID, PID-PSO, PID Tuner and ACO-PID.

Keywords - Automatic Voltage Regulator, African Buffalo Optimization, metaheuristics, Proportional, Integral and Derivative, Tuning.