



# SOFC-PV System with Storage Battery Based on Cuckoo Search Algorithm

Hamidia Fethia\* and Abbadi Amel

*LREA Laboratory, Yahia Feres University, Medea, Algeria.*

Received: March 9, 2022; Revised: September 13, 2022

**Abstract:** Each panel has an operating point (current, voltage) which allows it to deliver its maximum power. It is therefore necessary to try to control the choppers in order to stay as close as possible to the requested operating point. For this, we use the search algorithms for the optimal operating point (Maximum Power Point Tracker or MPPT). Lately, the MPPT technique has become the focus for a significant number of researches in order to improve the dynamic performance of the PV system, so we can distinguish several algorithms of the MPPT such as the P&O (Perturb & Observe) and those based on intelligent techniques such the meta-heuristic approach.

We will study and discuss in this work, the use of the Cuckoo Search (CS) algorithm to determine the maximum power point by using in the first section, the PV with a resistance load; in the second section, the same algorithm is used also to tune the PI controllers' gains of rotor speed and the DC-DC controller to adjust the DC Voltage coming from the PV/SOFC-Battery with an alternative load, in order to be able to supply the inverter which is connected to the induction motor and controlled by the Direct Torque Control (DTC), driving a centrifugal pump. The simulation results show the effectiveness of the proposed technique using the pumping system supplied by a hybrid source.

**Keywords:** *DTC; IM; hybrid SOFC-PV system; MPPT; battery storage; CSA.*

**Mathematics Subject Classification (2010):** 70Kxx, 93C10, 93-XX.

---

\* Corresponding author: [mailto:fe\\_hamidia@yahoo.fr](mailto:fe_hamidia@yahoo.fr)