

Fast DC-link voltage regulation and maximum power extraction for standalone PV/BES system using hybrid SPSA-DSMC	
Authors	Al-Wesabi Ibrahim, Zhijian Fang, Hassan M Hussein Farh, Khaled Ameer, Abdullrahman A Al-Shamma'a, Idriss Dagal
Publication Year	2024
Grant Number	IMSIU-RG23065
DOI link	<a href="https://doi.org/10.1109/ECCE53617.2023.10362571">10.1109/ECCE53617.2023.10362571</a>
<p><b>Abstract:</b> This research proposes a unique Direct Sliding Mode Controller (DSMCs) combined with hybrid salp and particle swarm algorithms (SPSA) for reducing the DC-Link capacitor's size through controlling different components in standalone generation system (PV/Battery Energy System) (PV/BES). The hybrid SPSA-DSMC-MPPT is used for regular PV system output power and providing smooth duty cycle to the converter switch. In addition, the dynamic DSMC controls the battery's DC-DC bi-directional converter (BDC) for eliminating the voltage instability on the DC-Link capacitor and boosting the reliability of the system tracking response. According to power supply, demand, and state of charge (SOC) of the battery, the system operates in four different modes. Simulation and experimental results prove the effectiveness of SPSA-DSMC and DSMC-BDC techniques in terms of fast tracking and robustness to regulate the DC-Link voltage comparing to the SPSA-PID and SPSA-PI techniques</p>	