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Title: A modified differential evolution based maximum power point tracker for photovoltaic system under partial shading condition

Author: Makbul A.M. Ramli Kashif Ishaque Faizan Jawaid  
Yusuf A. Al-Turki Zainal Salam



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1 A modified differential evolution based maximum power  
2 point tracker for photovoltaic system under partial shading  
3 condition

4 Makbul A. M. Ramli<sup>a</sup>, Kashif Ishaque<sup>b\*</sup>, Faizan Jawaid<sup>b</sup>, Yusuf A. Al-Turki<sup>a</sup> and Zainal Salam<sup>c</sup>

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7 <sup>a</sup>Department of Electrical and Computer Engineering, King Abdulaziz University, Jeddah 21589,  
8 Saudi Arabia

9  
10 <sup>b</sup>Karachi Institute of Economics and Technology, Karachi 75190, Pakistan.

11  
12 <sup>c</sup>Faculty of Electrical Engineering, Universiti Teknologi Malaysia, UTM 81310, Skudai, Johor  
13 Bahru, Malaysia.

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16 **Abstract**– This work proposes a modified differential evolution (MDE) based maximum power point  
17 tracker (MPPT) for photovoltaic (PV) system under partial shading condition. The proposed MDE  
18 does not involve any random numbers; hence, consistency of MPP tracking always prevails. Besides,  
19 it only contains one tuning parameter, i.e., mutation factor, which significantly simplifies the  
20 implementation strategy and therefore a low-cost micro-controller can be used for its realization.  
21 Despite the simpler MPPT structure, for each tested shaded curve, MDE always converges towards  
22 the global MPP within 12 perturbations. Performance wise, it outperforms another evolutionary  
23 algorithm, namely particle swarm optimization (PSO), which frequently traps at local MPP in shading  
24 conditions. The proposed MDE also works accurately for the measured data profile of a tropical  
25 country during 9.00 am to 5.00 pm, where it attains 99.5% average tracking efficiency.

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\* Corresponding Author: Tel: +9221-35091114, Fax: +9221-35091118  
Email Address: kashif.ishaque@pafkiet.edu.pk

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