

Erratum and Addendum: “A Standalone PV System with a Hybrid P&O MPPT Optimization Technique”

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Since the publication of our original paper in vol. 7, no. 6 of this journal [1], we have detected several misprints and errors that are corrected here, in the order in which they appear in the original paper.

The third sentence in the abstract can be rephrased as “a comparative analysis of power-voltage characteristics of a PV cell with and without the P&O MPPT module under various irradiances have been performed in SIMULINK in order to investigate the efficiency of the module.” The fourth sentence of the abstract should be omitted. The third sentence of the introduction section should be rephrased as: “the efficiency of the solar cell is small as it converts at most a 30% - 40% of solar irradiance into electrical energy.” The fourth sentence of the introduction section should be rephrased as: “to overcome this problem, the maximum power point tracking (MPPT) is used which increases the production about 20%-30%.” The fifth sentence of the introduction section can be rephrased as “a MPPT system is defined as an electronics device which guides the PV cell in a manner that a greater percentage of the power produced by the PV cell will be delivered to the load.” The third sentence of the first sub-section of section II should be replaced with: “When the sun light falls on the solar cell, the free electron in the N-type semiconductor gets energized and moves towards the P-side to fill up the holes.” The fifth sentence can be replaced with: “If there is no load i.e. $R_L=0$, then a short circuit condition occurs that means the short circuit current I_{sc} is maximum.” The remaining sentences should be replaced with: “When the cell is operated at $I_{sc}=0$ (open circuit), the shunt resistance R_{sh} is very high.”

In the second subsection of section II the unit of T_{op} and T_{ref} are represented as K instead of °C. Equation (3) can be replaced with:

$$I_d = I_s \left[\exp \left(\frac{(V + IR_{se})}{\eta V_T} \right) - 1 \right] \quad (3)$$

Equations (4) and (5) should be attributed to [11]. Figure 3 should be omitted and the rest of the figures should be renumbered. The last line should be replaced with: “Figure 3

shows the P-V curve of the PV cell with no MPPT considering the temperature and irradiation variation.” In section V, all sentences after the first one should be replaced with: “This model is simulated by considering C =Number of cells=36, $N_s=N_p=1$ (number of series and parallel paths). The simulations are performed under a standard temperature of 25 °C and various irradiation levels. As shown in Figure 9, 10, and 11, the maximum obtained power for $G=600 \text{ W/m}^2$, $G=800 \text{ W/m}^2$ and $G=1000 \text{ W/m}^2$ (no MPPT) is 12.375 kW, 13.387 kW and 14.82 kW respectively whereas the tracking efficiency is 38.67%, 41.83% and 46.31% respectively. Figures 12 to 14 represent the P-V curves with the use of P&O MPPT. As shown, for $G=600 \text{ W/m}^2$, $G=800 \text{ W/m}^2$ and $G=1000 \text{ W/m}^2$, the maximum obtained power now increases to 29.5 kW, 30.36 kW and 31.5 kW respectively whereas the tracking efficiency increases to 92.18%, 94.87% and 98.43% respectively. Hence with an open circuit voltage of 1000 V and short circuit current of 47 A, the maximum power that can be tracked is 31.5 kW. At both V_{oc} and I_{sc} instances, the power becomes 0. When the linear multiplication of VI is maximum, the condition for maximum power is obtained. The point at which the linear product of V and I is maximum is named as MPP.”

Table I should be omitted. The last sentence of the last section should be replaced with: “Under normal environmental condition maximum achievable power is 31.5 kW.”

The last two references in the original paper should be replaced with [2] and [3] and a new reference ([4]) should be added in the reference list of the original paper which should now read:

- [9] J. M. R. Malla, M. K. Sahu, and P. K. Subudhi, “PV based water pumping system for agricultural sector,” *Journal of Materials Today: Proceedings*, 2017.
- [10] T. A. Binshad, K. Vijayakumar, and M. Kaleeswari, “PV based water pumping system for agricultural irrigation,” *Frontiers in Energy*, vol. 10, no. 3, pp. 319-328, May 2016.
- [11] Ş. Yılmaz, H. Rıza Özçalık, M. Güneş, and O. Doğmuş, “Mathematical Model Derivation of Solar Cell by Using OneDiode Equivalent Circuit via SIMULINK,” *International Journal of Education research*, Vol. 1, No. 12, pp. 1-12, Dec. 2013.

Apart from Figure 3, Figures 10 and 11 should also be removed and the new figures shown below should be added:

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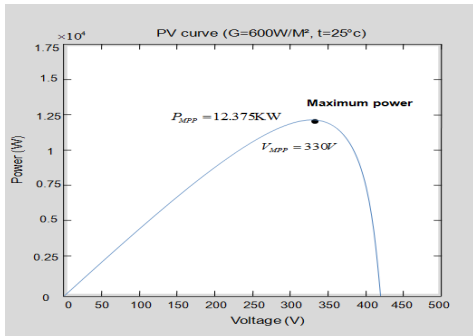


Fig. 9. PV curve ($G=600W/M^2$, $t=25^\circ C$) (Without MPPT).

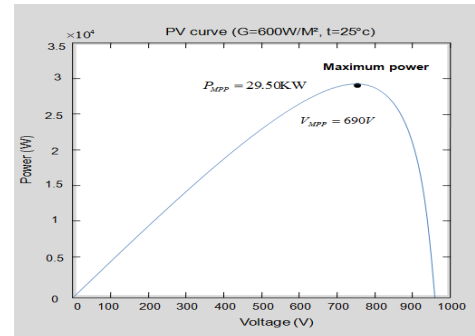


Fig. 12. PV curve ($G=600W/M^2$, $t=25^\circ C$) (With P&O MPPT).

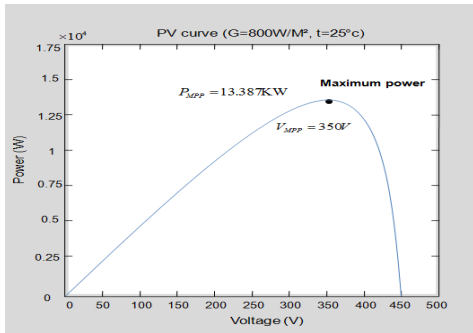


Fig. 10. PV curve ($G=800W/M^2$, $t=25^\circ C$) (Without MPPT).

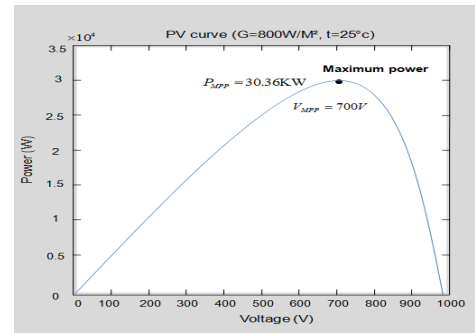


Fig. 13. PV curve ($G=800W/M^2$, $t=25^\circ C$) (With P&O MPPT).

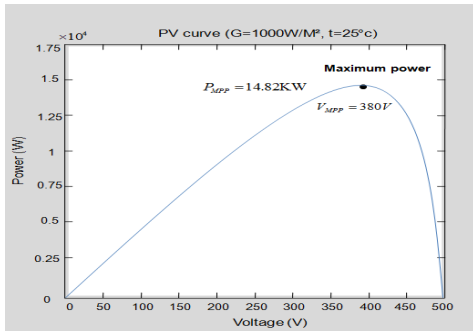


Fig. 11. PV curve ($G=1000W/M^2$, $t=25^\circ C$) (Without MPPT).

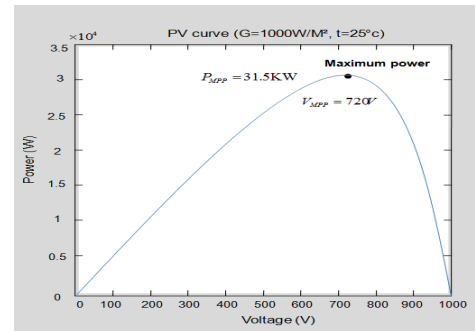


Fig. 14. PV curve ($G=1000W/M^2$, $t=25^\circ C$) (With P&O MPPT).

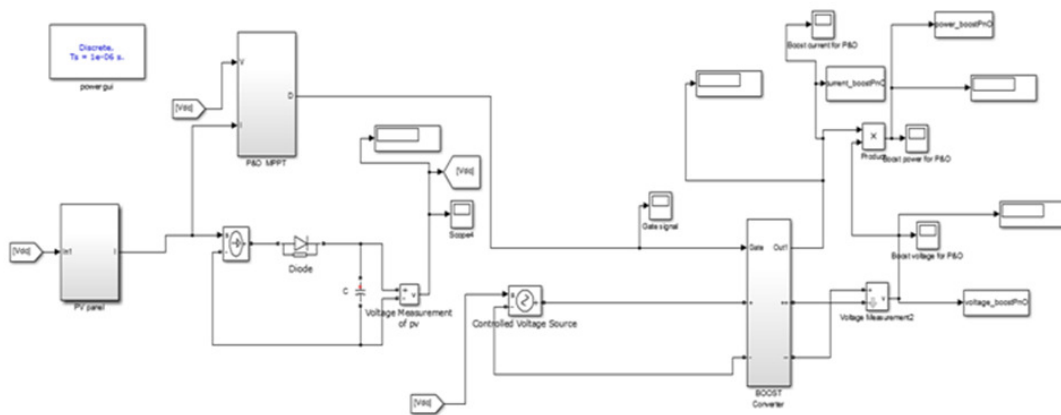


Fig. 15. The SIMULINK model.

REFERENCES

- [1] S. Hota, M. K. Sahu, J. M. R. Malla, "A Standalone PV System with a Hybrid P&O MPPT Optimization Technique," *Engineering, Technology & Applied Science Research*, vol. 7, no. 6, pp. 2109-2112, 2017
- [2] J. M. R. Malla, M. K. Sahu, and P. K. Subudhi, "PV based water pumping system for agricultural sector," *Journal of Materials Today: Proceedings*, 2017.
- [3] T. A. Binshad, K. Vijayakumar, and M. Kaleeswari, "PV based water pumping system for agricultural irrigation," *Frontiers in Energy*, vol. 10, no. 3, pp. 319-328, May 2016.
- [4] Ş. Yılmaz, H. Rıza Özçalık, M. Güneş, and O. Dođmuş, "Mathematical Model Derivation of Solar Cell by Using OneDiode Equivalent Circuit via SIMULINK," *International Journal of Education Research*, Vol. 1, No. 12, pp. 1-12, Dec. 2013.