ISSN PRINT 2319 1775 Online 2320 7876

RESEARCH PAPER UGC CARE LISTED (GROUP -I) JOURNAL VOLUME 10, SPL ISS 2, 2021

Implementation of Control Strategies for Energy Storage Systems and Solar Photovoltaic Systems for Maximum Utilization

Dr SVNL Lalitha,

[1]Department of Electrical and Electronics Engineering,

Koneru Lakshmaiah Education Foundation, Vaddeswaram, Guntur, Andhra Pradesh, India 522502. lalitha@kluniversity.in

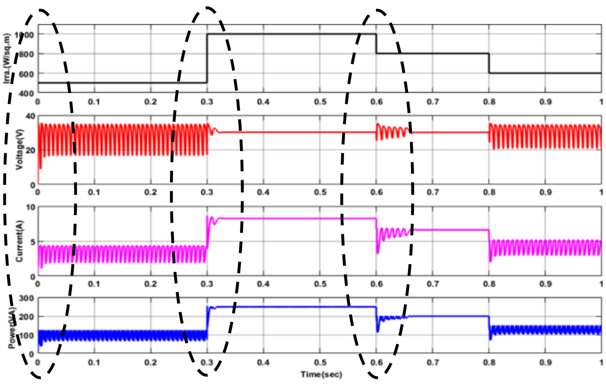
Abstract

In locations where the network is currently unavailable, solar photovoltaic (SPV) systems that are primarily based on autonomous systems have emerged as a possible solution to the problem of electrification. The following are the primary difficulties in designing such systems: Getting the most power possible out of a PV system with quickly changing irradiance; getting high voltage gain from a DC-DC converter; and creating an effective power-management strategy between SPV and an energy storage system (ESS). Existing schemes for autonomous systems require a minimum of three conversion steps to satisfy various objectives, which significantly reduces the system's efficiency and reliability. Different control strategies are used to handle the aforementioned problems. A modified non-iterative Incremental Conductance is used to extract the most power.

PROPOSED CONTROL STRATEGIES

Modified Incremental Conductance MPPT under fast varying irradiance

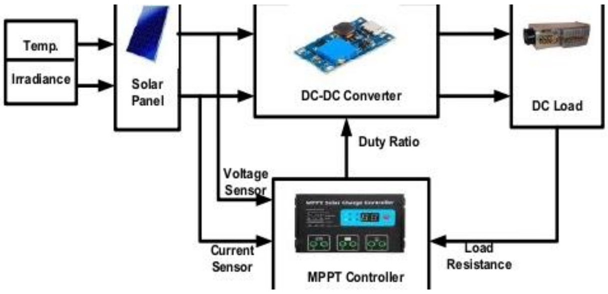
Simulation results for conventional INC MPPT method under fast varying irradiance



Simulation results for proposed modified INC MPPT method under fast varying irradiance[1]

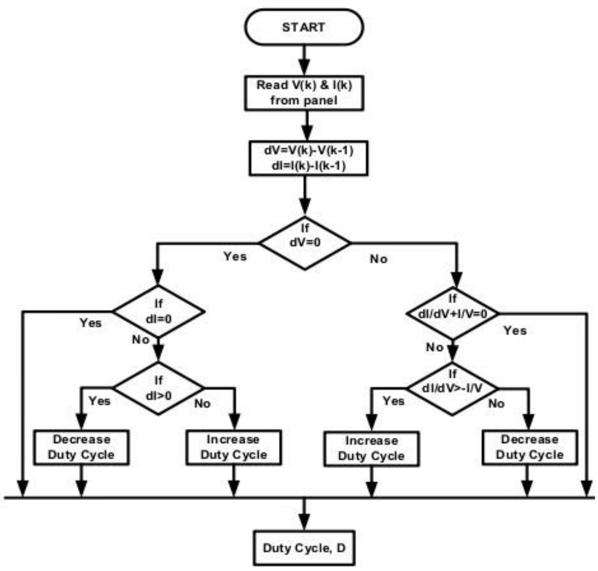
ISSN PRINT 2319 1775 Online 2320 7876

Block diagram of proposed DC/DC converter with modified INC Algorithm.

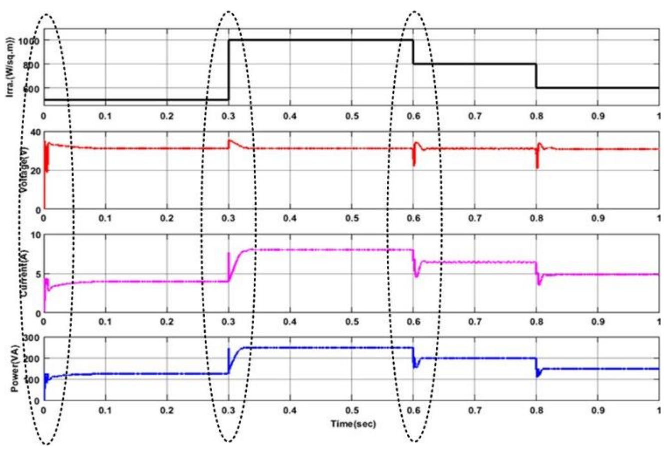


Conventional INC MPPT alogithm

u v



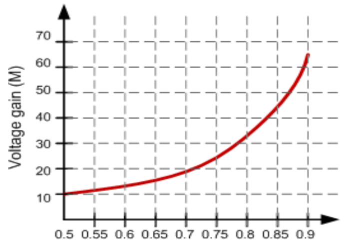
Simulation results for conventional INC MPPT [2] method under fast varying irradiance



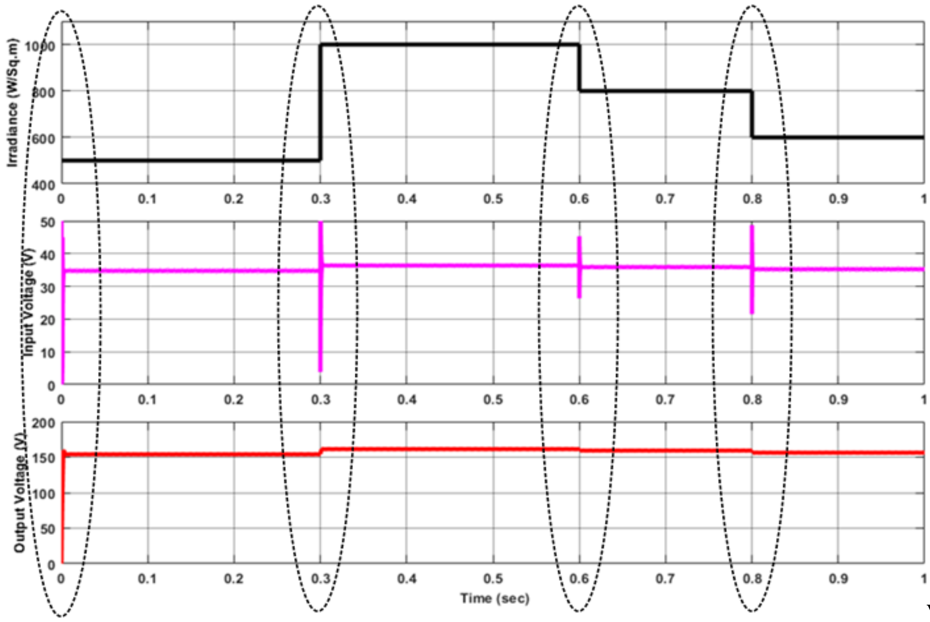
ISSN PRINT 2319 1775 Online 2320 7876

RESEARCH PAPER UGC CARE LISTED (GROUP -I) JOURNAL VOLUME 10, SPL ISS 2, 2021

VOLTAGE GAIN VS DUTY CYCLE



Simulation results for proposed modified INC MPPT method under fast

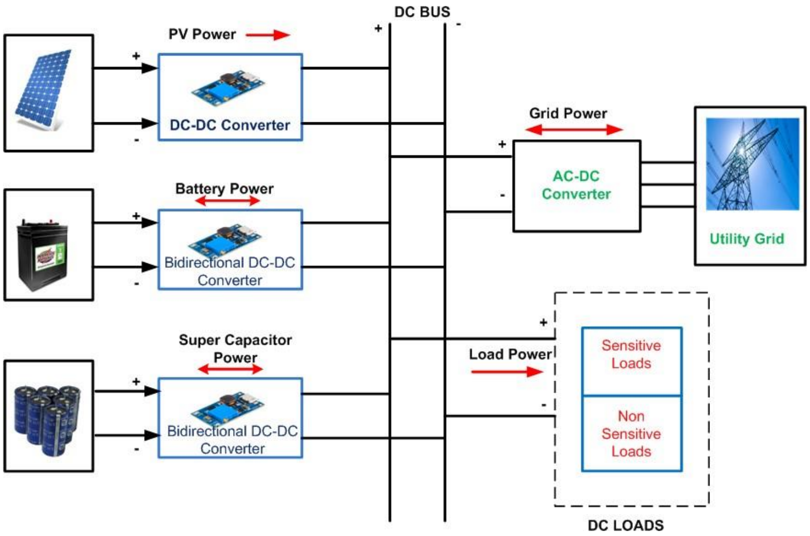


varying irradiance

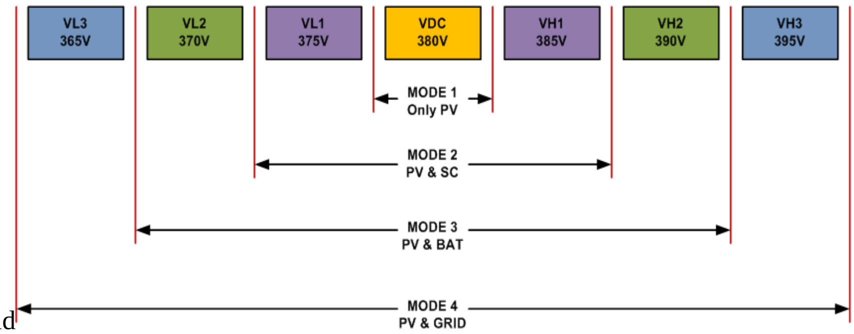
High Efficient variable DC bus voltage Power management scheme in DC microgrid:

ISSN PRINT 2319 1775 Online 2320 7876

RESEARCH PAPER **© 2012 IJFANS. ALL RIGHTS RESERVED, UGC CARE LISTED (GROUP -I) JOURNAL VOLUME 10, SPL ISS 2, 2021**



Modes of operation in power management strategy in a hybrid



microgrid

TRANSITION BETWEEN MODE I AND MODE II: (A) PVPOWER, (B) SC POWER, (C) LOAD POWER, (D) SC VOLTAGE, (E) SC CURRENT, (F) DC BUS VOLTAGE

CONCLUSION

Different control mechanisms are examined for a DC microgrid with an energy storage system. In order to track the maximum power under rapidly variable solar irradiation, a new MPPT approach is first developed. Given that the suggested MPPT is not

Figure 16 illustrates the change from Mode I to Mode II. PV power, SC power, load power, SC voltage, SC current, and DC bus voltage are only a few examples.

a method that iteratively tracks the MPP whenever there is a change in load or irradiance. The findings demonstrate that the suggested system's operation lowers steady state oscillations, which enhances the dynamic

REFERENCES

[1] V. M. Jyothi, T. Vijay Muni, S V N L Lalitha, "An Optimal Energy Management System for

ISSN PRINT 2319 1775 Online 2320 7876

RESEARCH PAPER **© 2012 IJFANS. ALL RIGHTS RESERVED, UGC CARE LISTED (GROUP -I) JOURNAL VOLUME 10, SPL ISS 2, 2021**

PV/Battery Standalone System," International Journal of Electrical and Computer Engineering, vol. 6, pp. 2538, 2016.

[2] T. Vijay Muni, D. Priyanka, S V N L Lalitha, "Fast Acting MPPT Algorithm for Soft Switching Interleaved Boost Converter for Solar Photovoltaic System", Journal of Advanced Research in Dynamical & Control Systems, Vol. 10, 09-Special Issue, 2018.