(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :03/04/2025

(21) Application No.202541032864 A
(43) Publication Date : 02/05/2025

(54) Title of the invention : FRONT END PID CONTROLLER FOR SOLAR INSTALLATION

(51) International classification :G05B11/42, G05F1/67, H02M3/00
(86) International Application No :NA
Filing Date :NA
(87) International Publication No : NA
(61) Patent of Addition to Application Number :NA
Filing Date :NA
(62) Divisional to Application Number :NA
Filing Date :NA

(71)**Name of Applicant :**
1)RATHINAM ANGAMUTHU
Address of Applicant :Ammapet, Salem ----------- -----------
2)Dr.C.Arulkumar
3)Dr.S.Ramachandran
4)Dr.G.Balaji
5)S.Devadharshini
6)M.Kavipriya
7)S.Nathiya
8)A.Priyadharshini
9)R.Janani
10)A.Nisha
11)N.Pooja
12)Paavai Engineering College
13)R.Satheeshkumar
Name of Applicant : NA
Address of Applicant : NA
(72)**Name of Inventor :**
1)Dr.C.Arulkumar
Address of Applicant :Assistant Professor, Department of EEE Paavai Engineering College Namakkal ----------- -----------
2)Dr.S.Ramachandran
Address of Applicant :Assistant Professor, Department of EEE Paavai Engineering College Namakkal ----------- -----------
3)Dr.G.Balaji
Address of Applicant :Professor, Department of EEE Paavai Engineering College Namakkal ----------- -----------
4)S.Devadharshini
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
5)M.Kavipriya
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
6)S.Nathiya
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
7)A.Priyadharshini
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
8)R.Janani
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
9)A.Nisha
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
10)N.Pooja
Address of Applicant :Student/EEE Department of EEE Paavai Engineering College Namakkal ----------- -----------
11)Paavai Engineering College
Address of Applicant :Department of EEE Paavai Engineering College, Paavai Nagar, NH-44, Pachal Namakkal -637 018. Namakkal ----------- -----------
12)R.Satheeshkumar
Address of Applicant :Assistant Professor, Department of EEE, Paavai Engineering College Namakkal ----------- -----------
13)Dr.A.Rathinam
Address of Applicant :Professor, Department of EEE Paavai Engineering College Namakkal ----------- -----------

(57) Abstract :
This project focuses on the effective power extraction methodology from Photo Voltaic (PV) with a front-end DC-DC Resonant converter with dual control. Usually, conventional DC-DC boost converter shows lower efficiency and extra components for soft-switching. Further, converter power transfer efficiency for PV integration is limited. Hence, to address these challenges this paper investigates an isolated DC-DC resonant converter with proposed control to attain wider voltage regulation with maximized PV power generation. In addition, this converter can achieve zero voltage switching under wider operating loads. The proposed control method improves the efficiency even under light load condition without effecting digital-signal-processor resolution, along with a simple Perturb and Observe maximum power point PI control approach. A 2.2-kW prototype is built and operated to interface PV system and to verify the performance over entire load. The peak efficiency of the converter is found to be 98.7% at (1.1-kW) 50% of the full load. Utilization of solar photovoltaic Cell (SPVC) has significantly increased in residential, commercial, and industrial due to freely available. From the power-voltage (P–V) curve, fluctuation has been revealed over an hour because of varying irradiance, and temperature of sun rays. Maximum power point tracking (MPPT) has been essential to track power and maximize the output from SPVC constantly. In this study, a novel Improved Incremental Conductance (IIC) MPPT technique is proposed, and integrated with a boost converter to take out the maximum power from SPVC. The output power has been provided to a brushless DC motor. Pulse Width modulation (PWM) commutation system has been employed to control through the 3-level bridge converter. The complete analysis has been examined at different irradiation conditions. Power consumption, loss, and efficiency have been estimated. Simulation results have been compared with conventional incremental conductance (IC). The proposed IIC MPPT has an improved 5% of tracking efficiency than conventional MPPT techniques. The results show that the effectiveness of the proposed IIC technique has attained a steady state in varying irradiation levels. In spite of the low irradiation level of 250 W/m2, the system remains effective.

No. of Pages : 7 No. of Claims : 1