

SPECIAL SEMINAR

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Characterization and Modeling of Solar Photovoltaic Panels

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Abstract

Immense potential of Solar power can be tapped by photovoltaic energy conversion, the efficiency of which can be greatly enhanced by the use of improved models of PV resources with accurate parameters. Challenges and proposed solutions in parameter identification of PV systems will be highlighted in the talk, along with the discussion on a novel sequential optimization based PV panel parameter estimation method. This method is based on actual panel output and therefore is robust with respect to ambient changes and aging. To measure the ambient condition an in-house developed solar irradiation meter will also be discussed. High power PV array characterisation is another challenge in large solar farms for which a switched mode power converter based characterisation set up will be discussed in the talk. Partial shading is one of the most recent challenges in PV industry due to the increased installation of PV panels in residential areas. This not only reduces the output but can also cause deteriorating hot spots on the shaded panels. To understand the phenomenon of partial shading, a detailed model including subcell level behaviour analyses the output of PV panels under different kinds of shading patterns with varying ambient conditions, which improves the output prediction accuracy by 5-10% as compared to the average insolation based modelling approaches.

Biography

Miss Pallavi Bharadwaj received the B.E. degree in electrical engineering from the Delhi College of Engineering, Delhi, India, in 2012, and the M.E. degree in electrical engineering in 2014 from the Indian Institute of Science, Bangalore, India, where currently she is working towards the Ph.D degree from the Department of Electrical Engineering. Her current research interests include photovoltaic power conversion, power electronics for renewable energy systems, grid connected power converters and energy storage issues. She received a gold medal in her bachelors and the best master's thesis in power engineering. In her PhD she has authored fifteen national and international conference, journal and patent publications.