

## SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING  
COLLEGE OF DESIGN AND ENGINEERING

Website: <https://cde.nus.edu.sg/ece>

**Area: Power and Energy Systems (PES)**

**Host: Prof Dipti Srinivasan**

**This seminar is co-organized by GEMS, ECE, NUS and IEEE Power & Energy (PES) Singapore Student Branch.**

<b>TOPIC</b>	:	<b>Toward Reliable PV-Grid Digital Twins: Stable and Physically Meaningful Parameter Extraction for Two-Diode PV Models</b>
<b>SPEAKER</b>	:	<b>Ms Varsha Dahiya Graduate Student, ECE Dept, NUS</b>
<b>DATE</b>	:	<b>Monday, 6 April 2026</b>
<b>TIME</b>	:	<b>2:00PM-3:00PM</b>
<b>VENUE</b>	:	<b>E7-03-06 Seminar Room 1</b>

### ABSTRACT

Photovoltaic (PV) systems in modern power grids require reliable PV-grid digital twins for performance assessment, power prediction and maximum power-point tracking. However, identifiable parameter extraction for the double-diode model (DDM), which underpins these electrical models, remains a highly underdetermined inverse problem due to parameter coupling, and structural degeneracy. This seminar presents a machine-learning-assisted hierarchical physics-guided three-stage framework, for module-level three-point DDM parameter extraction at STC conditions. The proposed framework is designed to improve both solution reliability and computational tractability by integrating machine-learning-architecture with Newton-Raphson based solver and constrained nonlinear refinement. Evaluated across 6,432 fitting cases from more than 600 PV modules show low reconstruction error, and more stable physically reliable solutions than conventional single-stage methods.

### BIOGRAPHY

Ms. Varsha Dahiya is currently pursuing a Ph.D. degree in the Department of Electrical and Computer Engineering at NUS under the supervision of Prof. Dipti Srinivasan. Her research focuses on photovoltaic systems, with emphasis on PV performance modeling, reliability assessment, power-predictions and digital-twin-driven analysis for large-scale solar applications.

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