Smart Grid

Complex Engineering Problem.

Problem Statement:

The given complex engineering problem is to Design Fuzzy Logic Controller to extract the maximum power point technique of solar system. The main issue in maximum power point technique is it takes to much time to settle voltage of converters, moreover this will be further analyzed when sudden changes occur in irradiance and temperature of environment. The previous MPPT technique P&O have mathematical algorithm that takes more times to settle down the voltage, while fuzzy logic controller gives sharp and precise decision and will give better results as compared to P&O technique.

During solving these issues students have to design a solar based DC nano grid in which solar array will be connected to DC load and controller is designed to extract maximum power point from solar system by adjusting the duty cycle.

How to implement rules of P&O for MPPT controller.

Decide the input variables for Fuzzy Logic controller?

Design the rules for controlling the Fuzzy Logic controller?

WP1 Depth of knowledge (WK3 - Engineering Fundamentals, WK5 - Engineering Design, WK6-Engineering Practice, WK8 - Research Literature)

A solar array must be designed with different combinations of series and parallel modules. Implement solar system Array in MATLAB and **Analyze** the PV and IV curves. **Design** DC Converter (all parameters of converter like inductance and capacitance) for DC voltage for output voltage of 500V. input of DC may vary for different groups. Implement P&O method for solar system as basic model. Implement any of fuzzy logic technique either Gaussian or triangular technique for MPPT

WP3 Depth of Analysis:

The selection of inputs and rules for design of Fuzzy Logic Controller is the main goal of this task that gives the accurate results, the settling point of converter should be less than previous techniques.

WP2 Conflicting Requirements:

Moreover, the **comparisons** of results (**Voltage, Power, and current**) with previous technique of P&O and analysis by students of graphs are further parts.

CLO4	To analyze and design of Microgrids/Nano grids via software.	PLO04	Psychom otor	3. Imitate

Performance	Meets Expectations (0.9-1.0)	Average (0.5-0.8)	Does not meet Expectations (0.0-0.4)	Marks
Simulation of techniques [4] CLO2	Selects relevant tools in simulation to solve experiment, ensures smooth operation and results match up to some extent with paper requirement.	Needs relevant tools in simulation to solve experiment, ensures smooth operation and results match up to some extent with paper requirement with minor error.	Have no idea about appropriate tools for solving paper and does not know how to use Simulation tools.	
Report of CEP [4] CLO2	Submit the CEP Report (Including Literature Review, procedure, and observations/graphs) on due time	Submit the CEP report (Including Literature Review, procedure, and observations/graphs) manual less accurate and not having information.	Submit the CEP report (Including Literature Review, procedure, and observations/graphs) manual less accurate and after due date.	
Comparison of Results [2] CLO2	Compare the results of different techniques and analyze the results with accuracy of some extent.	Compare the results of different techniques and analyze the results with less accuracy.	Can't compare the difference of results of different techniques.	
[10]				Total= [10]