



Dr. Mohammad Atif Siddiqui, Associate Professor & Head of the Department of Electrical Engineering, Integral University, Lucknow, is a dedicated academician and researcher in Control & Automation Engineering within the broader domain of engineering and applied sciences. He earned his PhD from the National Institute of Technology (NIT) Silchar, India, which providing him with a strong foundation in control systems, automation, and interdisciplinary research. His interests include emerging technologies, intelligent control, and sustainable, application-oriented engineering solutions. Dr. Siddiqui has actively contributed to research through peer-reviewed journal publications and conference presentations. He has supervised many PhD scholars, postgraduate dissertations, and undergraduate-level projects. Additionally, he has been actively involved in academic program development, professional training, and collaborative research initiatives.



Dr. Mohd Khursheed Siddiqui is an Associate Professor in the Department of Electrical Engineering at Integral University, Lucknow, India, with over 15 years of experience in teaching, research, and academic administration. He holds a PhD in Electrical Engineering from Integral university, Lucknow in the field of Renewable Energy and earned his postgraduate and undergraduate degrees in Electrical Engineering, from Aligarh Muslim University, Aligarh, India, with a strong academic foundation in power systems and Drives. He previously served as Head of the Department of Electrical Engineering for three years Dr. Khursheed has supervised numerous PhD scholars, postgraduate dissertations, and undergraduate-level projects. He has published several research papers in peer reviewed reputed journals and IEEE-indexed conferences and has edited one academic book. His research interests include renewable energy integration, electric vehicle technology, DC microgrids, multilevel inverters, EV-to-grid systems, and AI-based power management.

Control, Simulation, and Optimization in Modern Power and Renewable Energy Systems

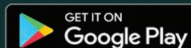
CONTROL, SIMULATION, AND OPTIMIZATION IN MODERN POWER AND RENEWABLE ENERGY SYSTEMS

Edited by
Dr. Mohammad Atif Siddiqui
Dr. Mohd Khursheed Siddiqui



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**Mohammad Atif Siddiqui
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Engineering, Integral University,
Lucknow, UP, India**

**Mohd Khursheed Siddiqui
Department of Electrical
Engineering, Integral University,
Lucknow, UP, India**



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Chapter – 2

Proportional Integral Controller Based Electric Vehicle Charging System

Mohd Khursheed¹, Gayanedar Bahadur Singh²

^{1,2}Department of Electrical Engineering, Integral University,

Lucknow, UP, India, 226026

Abstract: In this dissertation, a comparative study has been made between two controllers for an OFF-board electric vehicle (EV) charger. Generally, two stages of conversion have been used in EV charger i.e., AC-DC and DC-DC. The controller of first stage having two loops i.e., outer control loop and inner control loop. The outer control loop is quite slow and is utilized to track the voltage/power command. The faster inner loop is used for controlling the grid current. The controlling of grid current can be done either in dq or abc frame. To control the current in dq frame, regular proportional integral (PI) controller is utilized due to its capability to track the DC quantity. The controller is simulated in MATLAB/Simulink environment.

1. Introduction

Electric vehicles (EVs) have gained wide acceptance worldwide in the past two decades due to increase in carbon emission by fuel-based vehicle in environment. As, the number of EV increases day after day, in the near future, it is projected that many EVs will link to the distribution grid. This will raise the power quality issues and will cause under-voltage and over-voltage issues in the power grid. To overcome from these issues, there must be a proper and smart charging system to support the grid [1].