



# Dileep Kumar

Ph.D. Candidate @ IITK

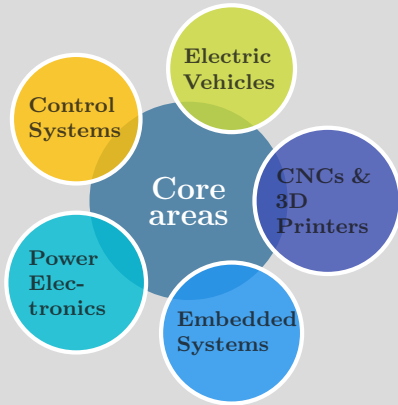
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## Fields of Expertise –



## Softwares

■ Octave, MATLAB/Simulink

■ Linux/Unix

■ Latex

■ Embedded C/C++

■ dsPIC, STM32, ESP32, 8051

■ CAN, SPI, I2C, QEI

## Skills

■ Theoretical and Analytical

■ Practical/Hardware Development

## Education

2015 – 2023	Ph.D. [CGPA: 8.00/10] Control and Automation, Electrical Engineering [Thesis Submitted]	IIT Kanpur, India
2010 – 2012	M.Tech [CGPA: 8.25/10] Control Systems, Electrical Engineering	NIT Patna, India
2010 – 2012	B.Tech [CGPA: 7.62/10] Electronics and Communication Engineering	SMVDU J&K, India

## Employments

2022 – To date	Senior Student Research Associate [Part Time] Department of Electrical Engineering	IIT Kanpur, India
2019 – 2021	Tutor (Spring 2019, 2020 & 2021) [Part Time] Department of Electrical Engineering	IIT Kanpur, India
2012 – 2015	Assistant Professor [Full Time] Department of Electrical Engineering	NIET, Jaipur, India

## Professional and Technical Experiences

Electric Vehicles	<ul style="list-style-type: none"><li>– Path-Tracking Control Algorithms of Four-Wheel Independent Steering Four-Wheel Independent Drive (4WIS4WID) EVs .</li><li>– Optimal Tire Usage in 4WIS4WID EVs .</li><li>– Involved in the Development of a Human-Driven Full-Size 4WIS4WID EV at IITK.</li><li>– Experience with Hardware-in-Loop Simulator (HILS) for Path-Tracking Control of a 4WIS4WID EV Testbed Developed at IITK.</li><li>– Experience in deploying CAN Communication with 8 Nodes used in the Testbed.</li><li>– Tank-to-Wheels and Well-to-Wheels Energy Efficiency of Battery Electric Vehicles (BEVs) with In-Wheel Motors (IWMs).</li><li>– Disturbance Observer-based Control (DOBC) and Active Disturbance Rejection Control (ADRC) Schemes for IWMs.</li></ul>
Motor Control Systems	<ul style="list-style-type: none"><li>– Three Year Experience in Designing and Implementing Control Systems for DC Motors at Control Systems Laboratories of IITK.</li><li>– Implemented Speed and Current Tracking Control Systems for DC and BLDC Motors Using High-Gain Control and DOBC Schemes.</li></ul>
Power Electronics	<ul style="list-style-type: none"><li>– Developed a 48 V Inverter for a Brushless DC Motor using IC DRV8320S Interfaced with a Microcontroller.</li><li>– Developed a Maximum Power Point Tracking Controller for PV Array.</li></ul>
Others	<ul style="list-style-type: none"><li>– Experience with Controllers Involved in CNC Machines and 3D Printers.</li><li>– Projects on 8051 and Spartan 3e Kits (VHDL) for Demonstrating Full-Duplex Communication.</li></ul>

## Achievements

2009	Training for Red Hat Enterprise Linux-5.
2010 & 2015	MHRD Scholarship to Pursue M.Tech and Ph.D.
2019	Organized a Short-term QIP course on Frequency Domain Control System Design & Experiments at IIT Kanpur

## Presentation

2023	Oral Presentation at Institute Research Symposium (IRS'23, IIT Kanpur)
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## Extracurricular Skills

### Practitioner of TEAM-CBT (by Dr. David Burns)

- Emotional health enhancements
- Relationship enhancements

## References

### 1. Dr. Ramprasad Potluri (Ph.D. Supervisor)

Associate Professor,

✉ Department of Electrical Engineering, IIT Kanpur, India.

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### 2. Dr. Ashiwani Kumar (M.Tech Supervisor)

Assistant Professor,

✉ Department of Electrical Engineering, NIT Patna, India.

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### 3. Dr. Manish Sabraj (B.Tech Supervisor)

Associate Professor and Head,

✉ Department of Electrical Engineering, SMVDU, J&K, India.

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### 4. Dr. Kumud Ranjan Jha

Associate Professor,

✉ Department of Electronics and Comm. Engineering, SMVDU, J&K, India.

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## Publications

Published Dileep Kumar, Vasu Jain, and Ramprasad Potluri, "Energy efficiency of battery electric vehicles with in-wheel motors", *SAE International Journal of Sustainable Transportation, Energy, Environment, & Policy*, 4(13-04-01-0002), 2022.

Under Review Dileep Kumar and Ramprasad Potluri, "Significance of Motor Control Systems for Optimal Tire Usage in 4WIS4WID Electric Vehicles", *IEEE Transactions on Intelligent Transportation Systems*.

## Ph.D. Research

### Energy Usage and Tire Usage for Electric Vehicles with In-Wheel Motors

Energy Usage –**Tank-to-wheel** (TTW) energy efficiency of BEVs belonging to the category of **bikes, microcars, mid-size cars, full-size cars and buses**.

–These BEVs widely use **single central motor**, and **single or multiple in-wheel motors**.

–**Well-to-wheels** energy efficiency of BEVs and ICE vehicles.

Tire Usage –Study of **4WIS4WID EVs**, as these EVs have the potential to achieve a condition known as **optimal tire usage** (OTU).

–Examination of **five** existing works **block-diagrammatically** for how well their **path-tracking control** algorithms may achieve OTU.

–Recommendations of **DOBC** and **ADRC** schemes to be used in motor control systems for OTU.

## M.Tech Research

### Modeling and Control of Emerging Generation Technologies-based Distributed Generation System

–Modeling of **battery, fuel cell, and photovoltaic (PV) array**.

–Control and simulation of smart backup system for PV Array.

–**Maximum power point tracker** for PV array.

## B.Tech Projects

### Demonstrations of Full-Duplex Communications

8051 –Data acquisition system for real-time full-duplex communication using Atmel 8051 and RS485 using assembly and C Programming.

Spartan 3E –Full-duplex communication between two spartan-3e kits, along with a computer with 2400, 4800, and 9600 bps using VHDL programming.

## Research Project

### Human-Driven Full-Size 4WS4WD Electric Vehicle (Funded by DST-SERB, INDIA)

–Involved in **proposal writing**.

–Involved in the **vehicle development**.

–Developed **driving motor control systems** for the vehicle.