
Departmental Seminar

Seminar Title	: Modified State-Space Modeling and Voltage Mode Control Implementation for an Interleaved Boost Converter in Discontinuous Conduction Mode
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Venue	: Seminar Room (EE-205)
Date and Time	: 08 Jul 2025 (4:30 PM)
Abstract	: High-power boost converters have become an important part of Electric vehicles (EV), solar power applications, and microgrids. The Interleaved Boost Converter (IBC) has an important advantage over conventional boost converters, such as input current ripple cancelation, enhanced efficiency, and high reliability. Detailed analysis and design are essential to reduce the size of N-phase IBC. Analyzing the inductor ripple current is crucial in selecting inductors and capacitors to reduce the size of the IBC. Depending on the application required the number of phases can be chosen. While the modified state-space modeling technique has been adapted for a standard boost converter operating in Discontinuous Conduction Mode (DCM), it has not been previously applied to an Interleaved Boost Converter (IBC). This work uses the modification to develop a small-signal model for an IBC operating in DCM. Additionally, Voltage Mode Control (VMC) is implemented to achieve a stable output voltage despite variations in load or input voltage. Simulation verification also takes place to ensure stable output voltage despite variations in input voltage or load conditions. The proposed framework and control strategy provides a more robust approach to the analysis and design of DCM converters.