EE561: Power Electronics Laboratory

Experiment 1: Simulation of Buck Converter using MATLAB/SIMULINK

Objective: The objective of this experiment is to familiarize the student with MATLAB/SIMULINK and important simulation settings. For this a buck converter with the following parameters has to be designed and simulated.

Parameters of the Buck Converter

Input voltage: 24 V

Output voltage: 12 V

Output power: 100 W

Switching frequency: 100 kHz

Ripple in inductor current: 25%

Ripple in output voltage: 0.1%

Report

The report should contain the following information

Circuit diagram and theoretical waveforms of buck converter

Design procedure and final design parameters obtained

Snapshot of the simulated circuit

Simulation results obtained: Input voltage, Output voltage, switching signal, inductor current, voltage across switch, voltage across diode

Snapshot of the simulation configuration parameters

Note: In Simulink, the circuit has to be simulated using a fixed time-step solver