Course No.: EE 592

Course Name: Selected Topics in Resonant Soft-switched DC-DC Converters

Credits - 2 (2-0-0-2)

Outline:

Increasing the switching frequency is necessary in order to reduce the size of a power converter. However, this results in increased switching power loss which is undesirable. Resonant/soft-switched converters attempt to solve this conundrum by keeping switching power loss to be near zero. In this course, we will explore how through zero current and zero voltage switching techniques, switching loss can be eliminated, in principle. We will also see how device and component parasitics can be used effectively as the additional elements needed for realizing these converters.

Different resonant/soft-switched converters and ways of analyzing them will be studied. These will include Series and Parallel Resonant Converters, Some Single Switch Resonant Converters, Active Reset Forward and LLC Resonant Converter. The analytical methods studied will include state-plane analysis, time domain analysis and fundamental frequency analysis. Design aspects of these converters will also be explored.

Reference: Resonant Power Converters by Marian K. Kazimierczuk & Dariusz Czarkowski John Wiley and Sons, Revised edition, Dear

Intended: UG/PG

Note: The students those who have fundamental knowledge of Power Electronics only are eligible to enroll in this course.