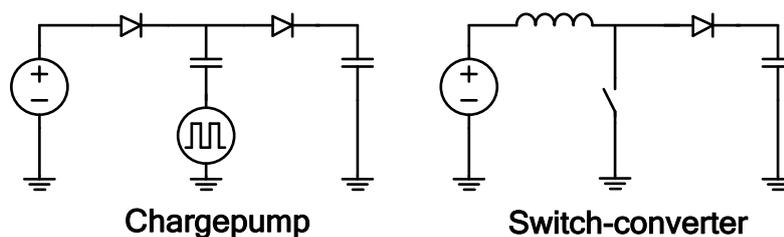
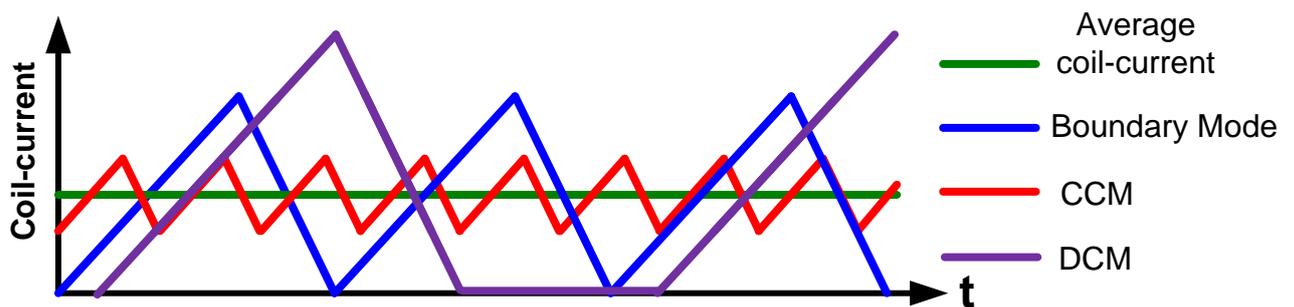


Bachelor Thesis

Mathematical Approach to the Modeling of Losses in Charge Pumps and Switch-converters

In electronic systems, e.g., a PC, different voltage levels are required which are generated by dc-dc-converters. Such converters generate adaptable voltages using a fixed supply voltage. The state of the art are capacitive (charge pumps) and inductive (switch-converters) dc-dc-converters that differ in terms of efficiency, cost, and size.

Switch-converters can be operated in one of the different modes: continuous conduction mode (CCM), discontinuous conduction mode (DCM), or boundary mode. Each mode has his pros and cons and is thus selected with regard to the application and the corresponding specifications for the switch-converter, e.g., power, input- and output voltage, coil inductance, or switching frequency.



The task of this bachelor thesis is to develop a mathematical model for the losses of a charge pump and a switch-converter. Thus, the two concepts can be compared and the most appropriate architecture be selected with regard to the application. Moreover, the losses in the different modes of a switch-converter should be analyzed in order to select the right mode for a given application.

What we expect:

Interest in deriving mathematical models for electronic circuits, autonomous working style, and well documented work. A good knowledge of math, physics and system theory is beneficial.

What we offer:

Intensive supervision of the thesis, nice work environment, latest CAD and EDA tools for the design of integrated circuits, well equipped laboratory, and the opportunity to form and implement your own ideas and concepts

Starting Date: flexible

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