

## Master Thesis

### Current Regulation for an Energy Harvesting Boost Converter

For energy harvesting applications, dc-dc converters are needed in order to convert the small and time-varying voltage of an energy harvester to a larger regulated output voltage. Typically, this task is performed by means of a boost converter. The duty cycle of the boost converter can be controlled by two approaches, i.e., by monitoring either the voltage across the coil or the current flowing through the coil. However, monitoring the current is preferred for its easier implementation and better control of the losses which correlate with the current through the coil.

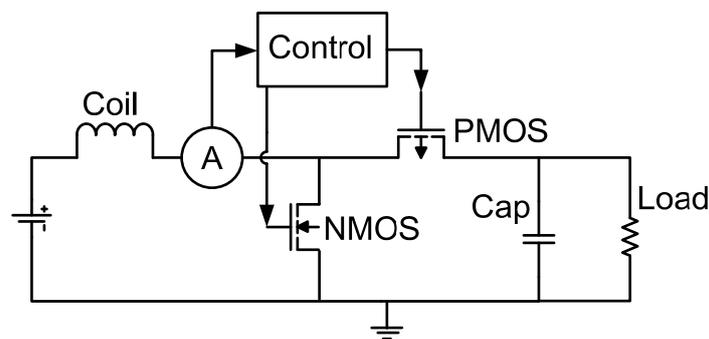


Figure 1: Illustration of a current controlled boost converter

As illustrated in Fig. 1, the task of this master thesis is to develop and implement a low-power current sensing technique and a low-power control circuit for the boost converter. Analog and digital control concepts as well as the dc-dc converter are thus to be evaluated and implemented using the CADENCE Virtuoso design suite. Since the harvested energy is limited, the power consumption of the control circuit represents a key design parameter and should be as low as possible.

#### What we expect:

having fun with the design and implementation of integrated microelectronic circuits, highly independent working style, and accurate documentation of the findings

#### What we offer:

Intensive supervision of the thesis, convenient work environment, latest simulation & software tools, excellent lab equipment, and creative leeway for developing and implementing your ideas

**Starting Date:** as soon as possible.

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