

Master Thesis

Implementation of an Integrated Switched Capacitor DC/DC Converter for Thermoelectric Energy Harvesting

A major issue in energy harvesting applications is power management since the connected load may exceed the power supplied by the harvester. As illustrated in Fig. 1, it can be performed by a multi-stage power management scheme: the energy extraction is maximized by the primary converter and the harvested energy stored in an energy reservoir while the supply voltages of the various loads are regulated individually by secondary converters.

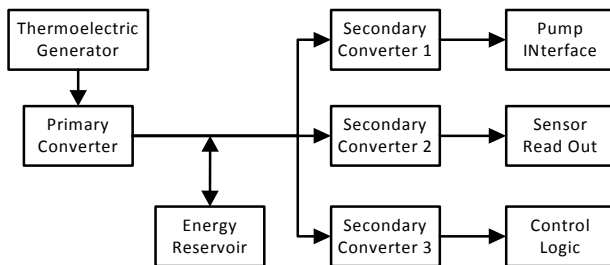


Figure 1: Exemplary power management architecture

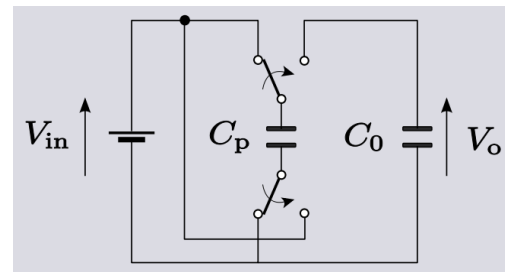


Figure 2: Capacitive voltage doubler

This thesis covers the design and implementation of the primary converter which transfers energy from the generator to the energy reservoir under the constraint of running the generator in its optimum power point. Thus, the challenge is to control the input node of the primary converter accordingly, while the voltage of the energy reservoir is less critical. The implementation will be performed based on the switch-capacitor technique illustrated in Fig. 2 in order to achieve a high grade of integration.

What we expect:

Interests in electronic circuits and their design, willingness to familiarize with the topic and the needed simulation equipment, well documented work, and teamwork.

What we offer:

Intensive supervision of the thesis, nice work environment and teamwork, latest simulation software tools, data analysis tools and free space for own ideas.

Starting Date: As soon as possible

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