

## Master Thesis: Magnetically Biased Inductors in Switching Converters

The master thesis work will be to investigate, design and test a switching power converter (Buck or boost type) with a magnetically biased inductor. The work will consist of literature studies, simulations, design, test and evaluation.

The power electronic industry are striving to shrink the power converter in both weight and volume while still delivering excellent performance. One possible way of making the magnetic component in the converter smaller is to utilize the magnetic material to a greater extent. In the common buck or boost type converter the material is not used as efficiently as it could be. By introducing a magnetic DC bias in the magnetic circuit of the inductor it could be possible to utilize the entire B-H curve of the magnetic material, this should in principle make it possible to make the inductor smaller.

The work will consist of:

- Literature studies
- Simulation
- Design
- Implementation
- Test
- Evaluation

When the thesis is completed the students will have simulated, design, assembled and tested at least one power converter with one “standard” inductor and one biased inductor, the students will then have measurement results from their tests to draw a conclusion from.

### Associated reading

[http://www.sts-trafo.com/fileadmin/user\\_upload/MaxFluxArtikel\\_BodoPower\\_Juni2014.pdf](http://www.sts-trafo.com/fileadmin/user_upload/MaxFluxArtikel_BodoPower_Juni2014.pdf)

[http://vbn.aau.dk/files/204303168/design\\_analysis\\_and\\_simulation\\_of\\_magnetic\\_biased\\_inductors.pdf](http://vbn.aau.dk/files/204303168/design_analysis_and_simulation_of_magnetic_biased_inductors.pdf)

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