Nils Lundström
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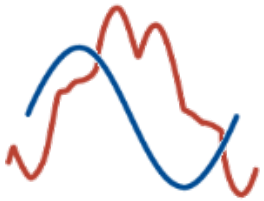
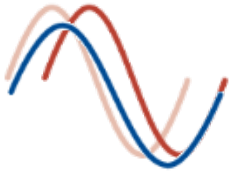
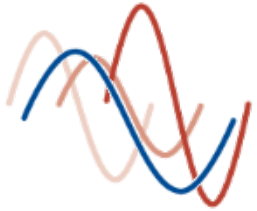
Electrical power isn´t perfect



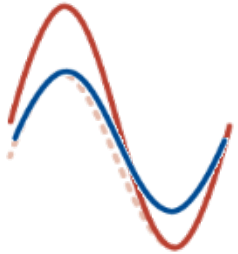
Harmonics



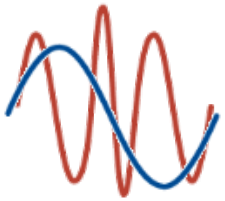
Reactive power



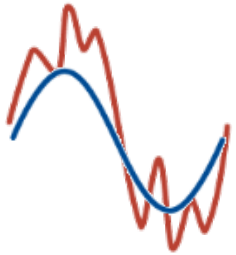
Network unbalance



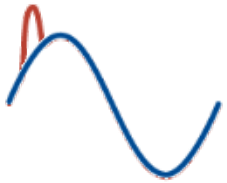
Voltage variations
(dips, sags, swells,
brown-outs)



Oscillations
(resonances)

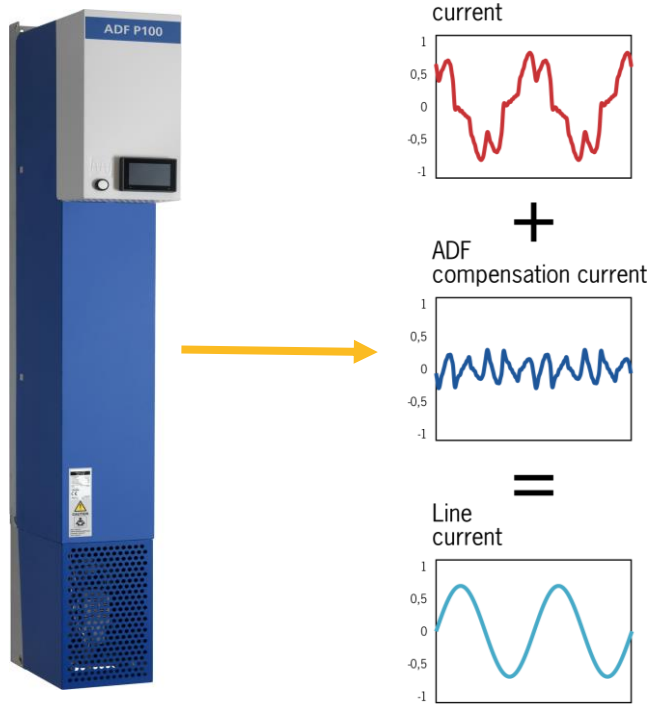


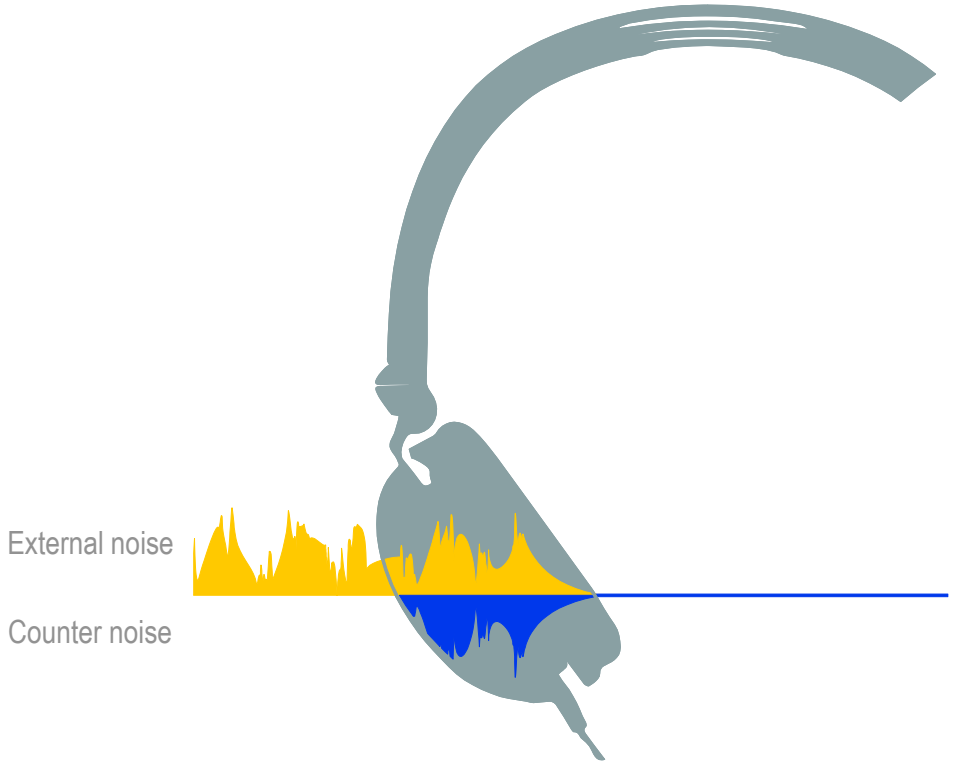
Flicker



Transients
(fast disturbances)

Our solution
-Active filtering of distorted current





–COMSYS–

Based in Lund

About 30 employees

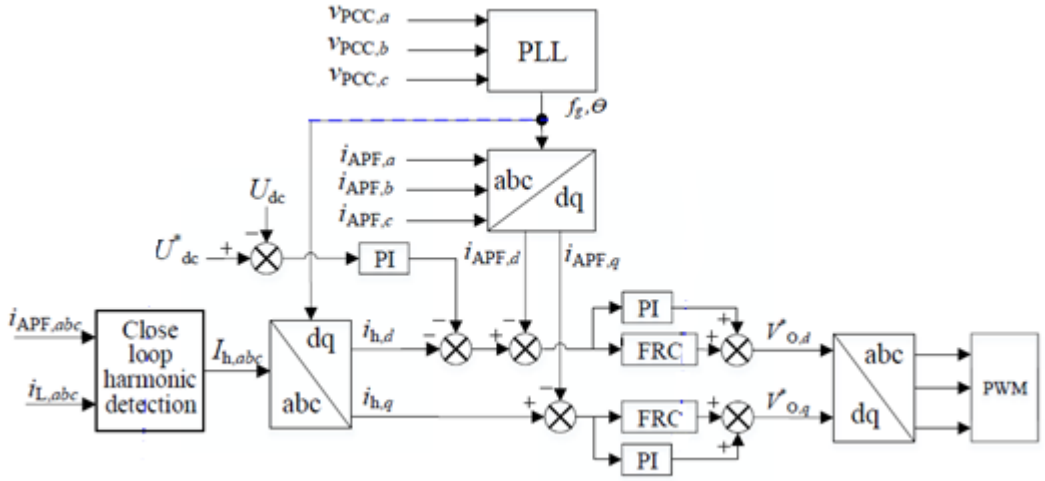
More than 75 partners all over the world

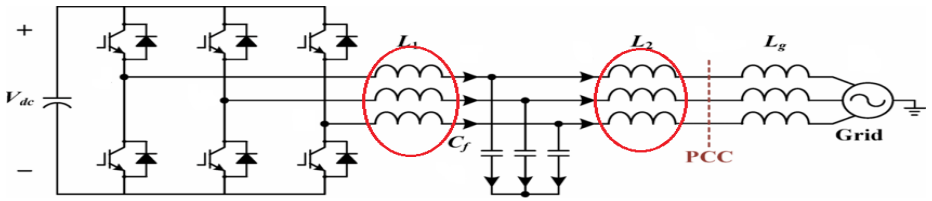
About 5 000 projects has been sold in over 50 countries

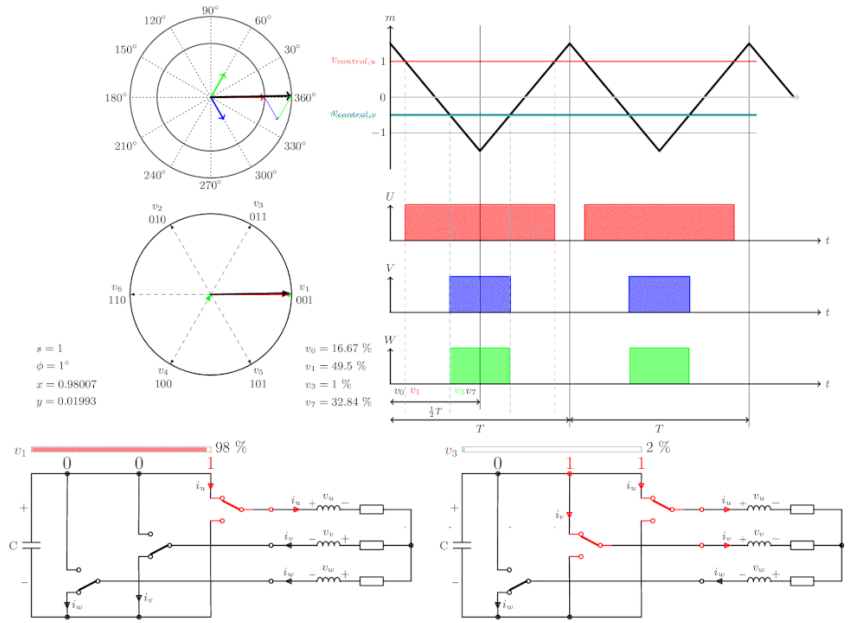
Our products are developed in Sweden; Manufactured in Sweden and US

Core areas

-Fast control, Power electronics and Inductive components







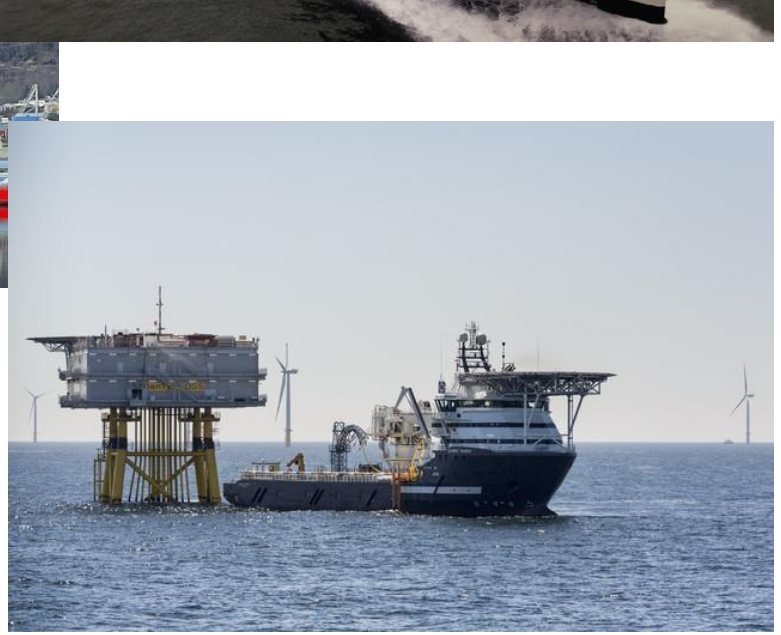
Active filters
–A wide range of applications









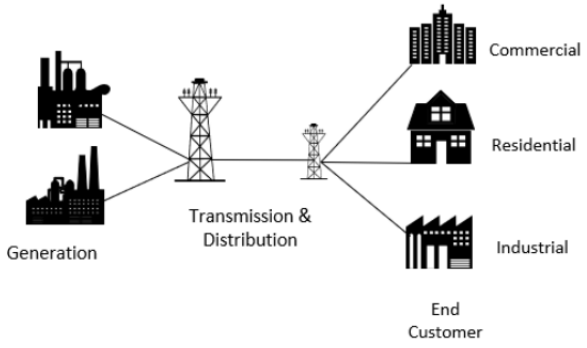


Add batteries
-Energy storage system

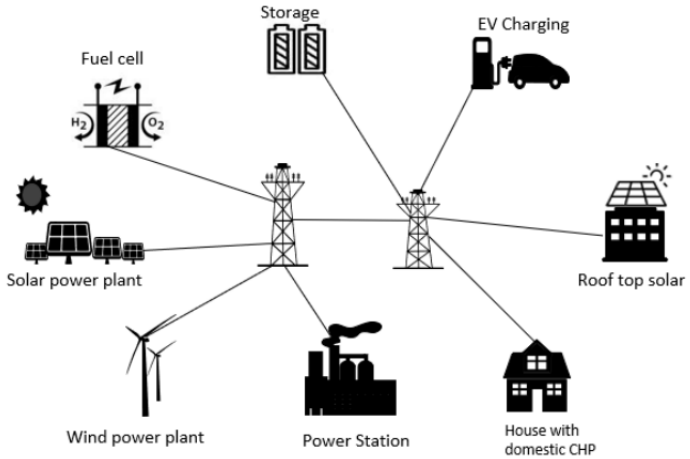
Master Thesis Project

Background
–The future holds a messy electrical grid

- The world is changing from a Centralized to a Decentralized energy System.
- Before: Few big, plannable, producers. Passive consumers. A strong grid.
- Future: Many small unplannable producers/consumers, each with an active influence on the grid dynamics
- New challenges
- Especially if you aim to sell power quality..



Centralized Energy System



Decentralized Energy System

Grid impedance

-Weaker, continuously changing, frequency dependent.

Questions arise:

- How to relate your grid connected system, and its control, to this complex grid.
- How to choose control methods to contribute to a more stable grid.
- How to, in a structured way, visualize and work with system stability.

Motivation

- This is a special area of knowledge, not known to many.
- With global electrification and transition to renewables -The demand for expertice in this area will be huge.

The work

- The work will be based on simulations in Matlab/Simulink.
- You will have supportive colleagues nearby.
- The work will be performed in cooperation with Dpt. of Automatic Control, LTH.

Welcome to Comsys!

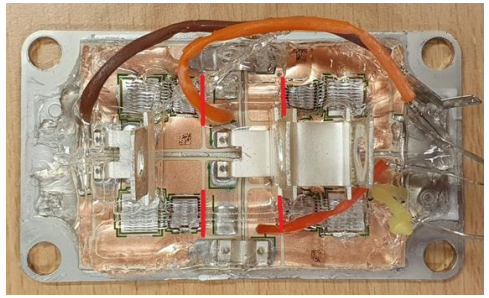
”Comsys is a growing company, within the area of power quality and a part of the ongoing green power transition”

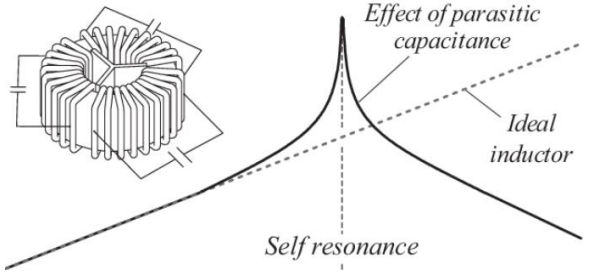
Model Based EMC

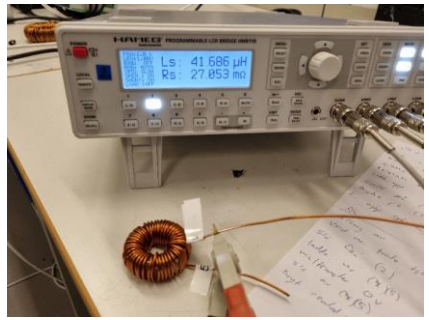
Develop methods to trustworthy simulate HF-behaviour of a system, IGBT converter / line filter / grid (up to a few Mhz)

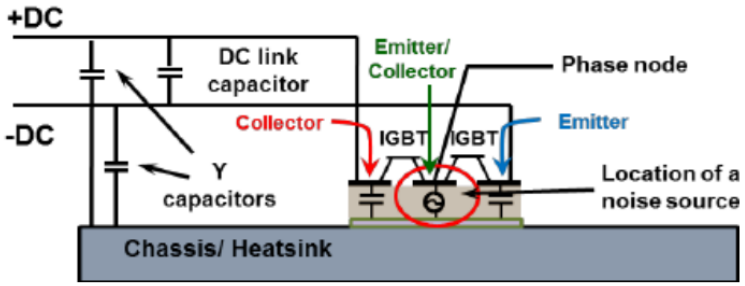
- Non ideal components, can't ignore stray elements
- Not trivial to model

In cooperation with IEA (Industrial Electrical engineering and Automation)

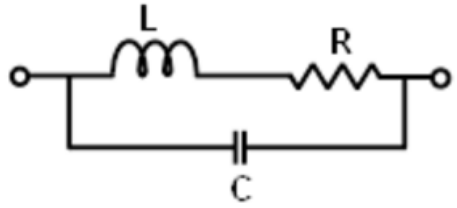








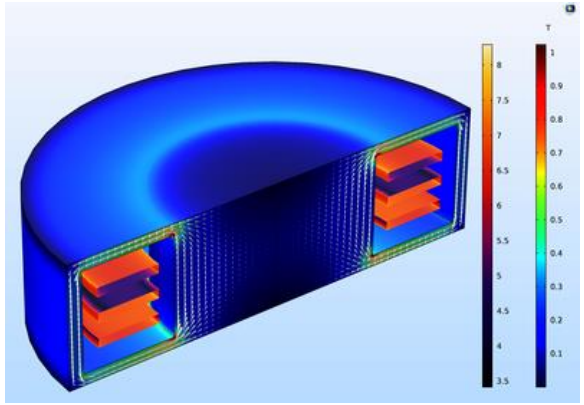
Location of the main "noise" source inside the IGBT module.



Coreless inductors for line filter applications

- Inductive core material is heavy, costly and has a non-linear behavior
- As an alternative, coreless (air core) inductors are being considered
- This technology is to be studied, simulated and tested
- Simulations in Comsol Multiphysics

In cooperation with IEA (Industrial Electrical engineering and Automation)



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