Summer 2018

Summer School Dnipro 2018

Modelling and Simulation of Renewable Microgrids

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TEC Technik

Contents

Objectives

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In this project week you will...

- Learn about renewable energy systems and their control in microgrids

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- Learn how to work on an international and interdisciplinary team

About Prof. Notholt

TEC Technik

Academic

2002	BSc. Mechanical & Electrical Engineering (MX)
2004	MSc. Renewable Energy Systems (GB)
2008	PhD in Electrical Engineering (DE)

Work

2005–2011	Research Staff Fraunhofer IEE
2011–2016	System Architect, SMA Solar Technology
since 4.2016	Professor Control Engineering

Contact

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The topic

The system

You have a large microgrid without a grid connection in south america. Nice place but it takes 3 weeks to get a fuel pipe truck to the site. You therefore want to integrate photovoltaics in the system. The region however, has a lot of fluctuations and a battery system is necessary.

The topic

The system

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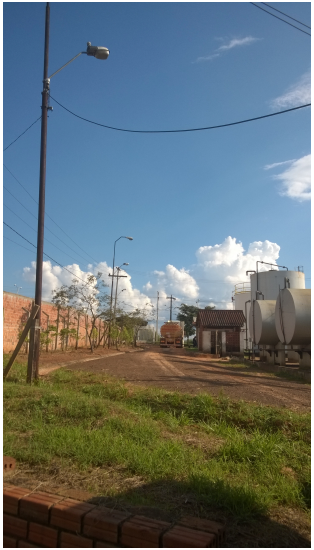
Your task is to propose a control system for PV generators and storage together with the most suitable PV/Battery proportions.



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Tasks

The next four days you will have several tasks to solve in teams of two

Component modelling

- Modelling of a PV producer (peak power variable)
- Modelling of an energy storage unit
- Modelling of a generator system

Financials

- Modelling of financial KPIs
- Cost analysis for different PV and Storage combinations

Control modelling

- Setting up all the units in a single model
- Develop a simple control strategy

Project Management

- Continuously keep track of other participants and help solving problems

Contents

Project setup and organization

All documentation and code will be saved in github
`https://github.com/notholt/UAHybrid`
You can set up an account and if you want, delete it after this week.
A very good free git GUI:
`https://www.sourcetreeapp.com/`

Project timetable

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Plan for this week

- Day 1
  - Know project setup and basic theory
  - Get to know each other and prepare tools
- Day 2
  - Component modelling is finished and committed
  - Controller is sketched and drafted
  - First economic calculations are done
- Day 3
  - Controller is finished and committed
  - Framework for economic calculations is done
  - Sensitivity analysis is run
- Day 4
  - Prepare documentation and presentation

Your presentation

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You will present your work on saturday afternoon in three groups

- Component modelling
- Control modelling
- Financials and recommendations

Each group will have **max. 15 minutes** to present with max. 5 minutes questions.