2023

Building Energy Flexibility Assessment with Static Data

Link: https://ieeexplore.ieee.org/document/10183044/

Descriptie: This paper presents a method that provides an indication of the energy flexibility characteristics of buildings based on static data about the characteristics of the building and building services.

From Energy Flexibility to Design Choice

Link: https://doi.org/10.1109/FES57669.2023.10182994.

Description: This research investigates how a Modelica computer model can be used to shape an advice on a buildings Energy Flexibility to help control engineers and designers make control and design choices on this subject.

Teaching and development project for an eMobility bachelor course

Link: 10.53375/icmame.2023.263

Description: To teach eMobility to bachelor students, a development project was set-up, to be undertaken by students. The aim is to explore the various aspects of eMobility by practical laboratory tasks. In the first phase of the project, an eKart was assembled.

Hierarchical Approach in Modeling and Simulation of Power Electronics for Education

Link: https://ieeexplore.ieee.org/document/10159642

Description: In this paper, a hierarchical modeling method is presented, which allows the simulation, of basic principles, up to detailed circuits.

Virtual Electric Machines Laboratory, Requirements and Practical Realization

Link: https://ieeexplore.ieee.org/document/10159763

Description: In this paper a virtual electric machines laboratory is proposed, where students can be trained, using digital twins of the electric machines from the laboratory.

Educational Power Logger for Electrical Machines Laboratory Experiments | IEEE Conference Publication | IEEE Xplore

Link: https://ieeexplore.ieee.org/document/10202450

Description: In this paper a low-cost measurement device is presented, for direct transformation of the three-phase voltages and currents into two-phase signals that can be displayed on a XY-oscilloscope.

The Development of an Universal Six Leg Inverter for Electrical Drives Laboratory Experiments

Link: https://ieeexplore.ieee.org/document/10202552

Description: In the paper, the design of the electric drives experimental set-up is outlined, together with typical measurement results from the set-up. The application of interchangeable gate-drivers, currents-sense and isolated power-supplies is detailed, required for fast repairs or changing components.

Stand-alone DC Nano-Grid for a Tiny House with Droop Control

Link: https://ieeexplore.ieee.org/document/10252427
Description: In this paper a Tiny House using a DC Nano-grid is presented. It includes solar converters, battery storage and USB outlets. The power flow and storage of solar energy in the battery is controlled via DC voltage droop control.

DC Grid Droop Control for Charging Electric Boats
Link: https://ieeexplore.ieee.org/document/10284264
Description: The developed power converters, required for a DC grid, are discussed in the paper. The droop control methods, to prevent power congestion in the grid are implemented in each power converter.

Low-Cost Converter Design to Interface Solar to Inductive Cooking in Rural Areas
Link: https://www.researchgate.net/publication/377618320_Low-Cost_Converter_Design_to_Interface_Solar_to_Inductive_Cooking_in_Rural_Areas
Description: Electric cooking is the subject in this paper, and a converter is proposed to connect a low-cost commercially available induction cooker to a DC micro-grid containing multiple typical solar/battery installations.

Configurable Educational DC System Trainer Combining Universal Code and Hardware
Link:https://www.researchgate.net/publication/375615799_Configurable_Educational_DC_System_Trainer_Combining_Universal_Code_and_Hardware

FPGA Based Data Acquisition for DC Grids
Link: https://ieeexplore.ieee.org/document/10310414
Description: This paper aims to explore the design of an FPGA-based 8-channel data-acquisition device. The hardware and hardware design language described in this paper, are purpose-built for a select set of components.

Configurable Educational DC System Trainer Combining Universal Code and Hardware
Link: https://ieeexplore.ieee.org/document/10310330
Description: Main goal of this converter is to use it as a way to implement a DC micro-grid, although it can also be used to teach students about micro-grids in practical lessons. This document will discuss the architecture and functionality of the code and show results measured in a lab environment.

Educational Switched Mode Power Supply Test Bench, for Laboratory Experiments and Teaching
Link: https://library.iated.org/view/NAGY2023EDU
Description: This paper presents the concept of Universal Two Leg (U2L), an educational power converter capable of being configured into 15 different switch mode power supply topologies.

Teaching Power Electronics Using Modeling and Simulation

Link: https://library.iated.org/view/KERSENSS2023TEA
Description: In this paper a multilevel modeling and simulation program Caspoc is presented that is used both during the oral lectures and during laboratory classes.

FPGA Based Data Acquisition for DC Grids
Link: https://jglobal.jst.go.jp/en/detail?JGLOBAL_ID=202302240528321475
Description:x

2022
Design of Wind and Solar Energy Supply, to Match Energy Demand
Link: https://doi.org/10.1016/j.clet.2022.100402
Descriptie: This paper delivers such guidelines by exploring design of hybrid wind and solar energy and unusual large solar installation angles.

The Effectiveness Of Direct Application Of Theory On Students' Progress And Understanding
Link: https://library.iated.org/view/VANDUIJSEN2022EFF
Description: This paper presents the evaluation of Electrical and Electronics Engineering bachelor students response to a power electronics laboratory. Our intention is to examine the effectiveness of direct application of theory on student's practical simulation and measurement skills.

Structuring a Switched Mode Power Supply Course, Part II: Laboratory
Link: https://ieeexplore.ieee.org/document/9803446
Description: In this paper (Part II) it is explained how the laboratory assignments should follow up the theory from the oral lectures. In the accompanying paper (Part I) it is described what the structure of the topics should be in order to closely match the oral lectures with the laboratory assignments.
Structuring a Switched Mode Power Supply Course, Part I: Lectures
Link: https://ieeexplore.ieee.org/document/9803707
Description: In this paper (Part I) an overview of topics is given that has to be included in a course. In the accompanying paper (Part II) it is described how the laboratory assignments should match the theory of the oral lectures

Droop Control in DC Grids for Kitchen Appliances to avoid Power Congestion
Link: https://ieeexplore.ieee.org/document/9804126
Description: A laboratory setup is presented along with a design tool and simulation tool to define the droop characteristics for a kitchen appliance.

A low cost implementation of a dual-stage interleaved bidirectional boost converter
Link: https://ieeexplore.ieee.org/document/9872985
Description: This paper describes the design and verification of a converter that allows bidirectional energy flow between a 48 volt battery storage system and a 350 volt DC grid.

Educational Laboratory Demonstrator for Teaching Dual Active Bridge Control Principles

Link: https://ieeexplore.ieee.org/document/9845754
Description: An educational demonstrator with accompanying simulation software is discussed that can be used to teach the various modulation methods for controlling the power flow in the Dual Active Bridge. Both the hardware demonstrator, simulation software as well as the teaching principle are outlined.

Universal power electronics hardware trainer for teaching the DC grid
Link: https://ieeexplore.ieee.org/document/9988666
Description: The paper discusses how an universal power electronics hardware trainer can be used, for multiple laboratory exercises, and some practical examples are elaborated.

Distribution Of Renewable Energy In Light-Rail Traction Grids
Link: https://ieeexplore.ieee.org/document/10010236
Description: This paper proposes, to use the traction overhead lines as a DC grid, for the distribution of the renewable energy. Renewable energy from solar farms and city facades, is transported via the traction overhead lines into the inner city center.

A low cost implementation of a dual-stage interleaved bidirectional boost converter
Link:https://scholar.google.com/citations?view_op=view_citation&hl=nl&user=qpIAru8AAAAJ&citation_for_view=qpIAru8AAAAJ:5nxA0vEk-isC
Description: This paper describes the design and verification of a converter that allows bidirectional energy flow between a 48 volt battery storage system and a 350 volt DC grid. Multiple converter designs are discussed, leading to the selection of multiple parallel dual-stage bidirectional synchronous buck-boost converters, with the option to apply distributed interleaving

A Practical Application of DC Droop Control with IoT capabilities
Link:https://scholar.google.com/citations?view_op=view_citation&hl=nl&user=qpIAru8AAAAJ&citation_for_view=qpIAru8AAAAJ:eQOLeE2rZwMC
Description: In this paper, a sustainable desk power application is described that can be used for powering typical office appliances such as computers, lighting, and telephones.

2021

Droop Control in DC Grids using the Universal Four Leg as Laboratory Setup
Link: 10.2139/ssrn.3899714
Description: The Universal 4 Leg is a laboratory setup for studying the functionality of a grid manager for power management

Laboratory setup for teaching DC grid droop control and protection
Link: https://ieeexplore.ieee.org/document/9596738
Description: The paper discusses the requirements on a hardware laboratory setup, to teach the basic principles as well the applications of DC grids for home and office applications.

Educational Set-up for Brushless Motor Drives
Link: https://ieeexplore.ieee.org/abstract/document/9503025
Description: Virtual online experiments as well as lab assignments are demonstrated that visualize every aspect of the brushless motor drive. The basic models for simulation and animation are presented and a typical laboratory set-up is demonstrated

Performance Characteristics of A Micro Wind Turbine Integrated on A Noise Barrier
Link: https://www.mdpi.com/1996-1073/14/5/1288
Descriptie: Micro wind turbine's performance has room for optimization for application in turbulent wind conditions on top of noise barriers.

Wind Resource Characteristics and Energy Yield for Micro Wind Turbines Integrated on Noise Barriers – An Experimental Study
Link: https://linkinghub.elsevier.com/retrieve/pii/S0167610520301161
Description: This paper assesses wind resource characteristics and energy yield for micro wind turbines integrated on noise barriers

Laboratory Setup for Teaching DC Grid Droop Control and Protection
Link: http://dc-lab.org/publications/Mipro2021dc.pdf

Description: The paper discusses the requirements on a hardware laboratory setup, to teach the basic principles as well the applications of DC grids for home and office applications.

Gaining Insights into Dwelling Characteristics Using Machine Learning for Policy Making on Nearly Zero-Energy Buildings with the Use of Smart Meter and Weather Data
Link: https://www.sdewes.org/jsdewes/pid9.0388
Description: This paper compares different supervised machine learning algorithms, namely Logistic Regression, Support Vector Machine, K-Nearest Neighbor, and Long-short term memory, and methods used to correctly implement these algorithms.

Power electronics and drives laboratory learning environment for electric vehicles

Link: http://dc-lab.org/publications/Mipro2021motor.pdf

Descriptie: In this paper the requirements and implemen- tation of a laboratory set-up is discussed which can be used to teach the application of motor drives including permanent magnet dc motors, brushless dc motors, stepper motors and permanent magnet synchronous motors.

Decentraal Grid? Neem Het Spanningsniveau Als Communicatiemiddel

Link: https://view.publitas.com/tvvl/tvvl-magazine-2-2021/page/8-9

Decriptie: Met het centraler worden van de electrictieitsvoorzienig valt er veel meer te zeggen voor de introductie van gelijkstroomnetten in gebouwen en wijken

Teaching Field Oriented Control Using Animation

Link: , https://doi.org/10.1109/ELMA52514.2021.9502966.

Description: The research question is if the 400V, 3-phase AC grid can be combined into a single cable with regards to cross-talk and safety.

Educational Droop Control Laboratory Setup

Link**:** https://doi.org/10.1109/ICECCME52200.2021.9591123.

Description: The main objective is to teach droop control in DC grids, both using manual interaction and via programmed droop characteristics.

Switching Power Supplies in DC Grids: The Smart Current Limiter

Link: https://papers.ssrn.com/abstract=3899359

Description: The Smart Current Limiter is a switching DC to DC converter that provides a digitally pre-set input current control for inrush limiting and power management. Being able to digitally adjust the current level in combination with external feedback can be used for control systems.

Samen Naar Een CO2-Neutrale Woningvoorraad

Link: https://www.renda.nl/samen-naar-een-co2-neutrale-woningvoorraad

Descriptie: Woningcorporaties staan aan de voet van een belangrijke fase in de verduurzaming van de woningvoorraad.. Maar welke beleidskeuzes en -instrumenten zijn ervoor nodig om de energie transitie te versoepelen?

Droop Control in DC Grids Using the Universal Four Leg as Laboratory Setup

Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3899714

Descriptie: The Universal 4 Leg is a laboratory setup for studying the functionality of a grid manager for power management.

A New Approach to Automated Energy Performance and Fault Detection and Diagnosis of HVAC Systems: Development of the 4S3F Method.

Link: https://research.tue.nl/en/publications/a-new-approach-to-automated-energy-performance-and-fault-detection

Descriptie: This paper studied which FDD architecture is suitable for HVAC systems in general to support the set up and implementation of FDD methods, including energy performance diagnosis?

Educational Set-up for Brushless Motor Drives

Link: https://doi.org/10.1109/ELMA52514.2021.9503025.

Description: All underlying physical properties of the brushless DC motor drive are easier to visualize compared to the brushed DC motor with mechanical commutator. Therefore this motor drive more is suited as an introductory course in motor drives

2020

Electronic Learning Experience Setup

Link:https://scholar.google.com/citations?view_op=view_citation&hl=nl&user=qpIAru8AAAAJ&citation_for_view=qpIAru8AAAAJ:u-x6o8ySG0sC
Description: A method to teach and instruct the workings of power electronics and electrical drives is presented. The combination and interaction between Oral lectures and practical laboratory assignments is presented, as well as the required tools.

Electronic Learning Experience Setup : Power Electronics and Electrical Drive Education
Link: https://ieeexplore.ieee.org/document/9245230
Description: A method to teach and instruct the workings of power electronics and electrical drives is presented. The laboratory assignments should follow the theory and simulation/animation is used to show the similarity and differences between theory and practice

Structuring, Controlling and Protecting the DC Grid
Link**:** https://doi.org/10.1109/ISETC50328.2020.9301065.

Description: Power congestion management greatly improves the DC grid. Although power electronics means extra losses per converter, so a lower efficiency, the DC grid can be used more efficient than the AC grid.

Fault Detection and Diagnosis for Indoor Air Quality in DCV Systems: Application of 4S3F Method and Effects of DBN Probabilities
Link: https://doi.org/10.1016/j.buildenv.2019.106632.
Descriptie: n this article a generic fault detection and diagnosis (FDD) method for demand controlled ventilation (DCV) systems is presented. By automated fault detection both indoor air quality (IAQ) and energy performance are strongly increased.
P&ID-Based Automated Fault Identification for Energy Performance Diagnosis in HVAC Systems: 4S3F Method, Development of DBN Models and Application to an ATES System
Link: https://doi.org/10.1016/j.enbuild.2020.110289.
Descriptie: The present article addresses the fault diagnosis process using automated fault identification (AFI) based on symptoms detected with a diagnostic Bayesian network (DBN).

P&ID-Based Symptom Detection for Automated Energy Performance Diagnosis in HVAC Systems
Link: https://doi.org/10.1016/j.autcon.2020.103344.
Description: This paper proposes detection methods to overcome these issues, based on the 4S3F (four types of symptom and three types of faults) framework.

2019
Control and Protection in Low Voltage DC Grids
Link: 10.2139/ssrn.3638072
Description: In this paper we discuss a 48 volt DC grid that is implemented as a living lab. In the living lab, droop control and short circuit protection are implemented.

Control and Protection in Low Voltage DC Grids
Link: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3638072
Descriptie: In this paper we discuss a 48 volt DC grid that is implemented as a living lab.

Enhancing Laboratory Learning Experience: A New Experimental Set-up for Power Electronics and Electrical Drive Education.
Link: https://www.sefi.be/wp-content/uploads/2019/10/SEFI2019_Proceedings.pdf
Description: This paper presents the use of a new experimental setup for power electronics and electrical drive experiments in teaching Electrical and Electronics Engineering bachelor students.

Requirements on Power Electronics for Converting Kitchen Appliances from AC to DC
Link: https://ieeexplore.ieee.org/document/8734392.
Descriptie: Congestion management is solved via droop control. Furthermore short circuit protection in a DC grid is implemented.

Forecasting Residential Gas Consumption with Machine Learning Algorithms on Weather Data
Link: https://doi.org/10.1051/e3sconf/201911105019
Descriptie: In collaboration with OPSCHALER, a measurement campaign on the influence of housing characteristics on energy costs and comfort, several machine learning models were compared on forecasting performance and the computational time needed

Is Het Mogelijk Om WKO-Systemen Te Leren Begrijpen Met Een Computerspel?
Link: TVVL Magazine
Descriptie: x
2018

Educational Setup for Power Electronics and IoT
Link:https://www.researchgate.net/publication/327520484_Educational_setup_for_Power_Electronics_and_IoT
Descriptie: In this paper we will present a method to facilitate bachelor students with educational laboratory setups which they can use to build fully operational mechatronic and power electronic systems in the spirit of the internet of things.

Combined DC/AC Supply on a Single Distribution Cable
Link: https://doi.org/10.1109/IESC.2018.8439962.
Description: The simulation and measurement results indicate that the power electronics safety components in the DC grid are largely unaffected by transients in the AC grid.

Brushed Universal Motor Controller for DC-Grids
Link: https://doi.org/10.1109/REM.2018.8421781.
Descriptie: In this paper we discuss the DC readiness of a typical household appliance, the vacuum cleaner.

DC — Readiness of a vacuum cleaner
Link: https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8384398

Description: This paper proposes a way to supply a vacuum cleaner from a DC grid instead from an AC grid.

Brushed universal motor controller for DC-grids

Link: https://ieeexplore.ieee.org/abstract/document/8421781

Description: In this paper we discuss the DC readiness of a typical household appliance, the vacuum cleaner. Traditional vacuum cleaners which are connected to the AC single phase grid contain a brushed DC series motor.