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A voltage-independent active load for frequency control in microgrids with renewable energy sources

3 Author(s) I. Serban ; C. Marinescu ; C. P. Ion [View All Authors](#)

3 Paper Citations

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Abstract

Document Sections

I. Introduction

II. AL Configuration


III. AL Control Method

Abstract:

This paper presents a voltage-independent control method for an active load (AL), which is designed for integration in microgrids with the main purpose of frequency control. Ideally, the AL should behave like a controllable linear current sink whose active power is independent of the input voltage. The proposed AL approaches the aforementioned conditions by combining a robust hardware structure with an optimized control method for this kind of applications.

Published in: 2011 10th International Conference on Environment and Electrical Engineering

2. <https://doi.org/10.1109/EUROCON.2011.5929262>



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A reduced model of permanent magnet synchronous generators for wind energy conversion systems

2 Author(s) I. Serban ; C. Marinescu [View All Authors](#)

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Abstract

Document Sections

I. Introduction

II. System Configuration and

Abstract:

This paper presents a reduced model for permanent magnet synchronous generators operating in variable-speed wind energy conversion systems (WECS). The generator supplies power to a diode rectifier bridge with constant-voltage load. The proposed model has the main advantage of low complexity, thus making it ideal to include in complex systems, such as microgrids. The model was validated on a 2kW laboratory prototype.

Published in: 2011 IEEE EUROCON - International Conference on Computer as a Tool

3. <https://doi.org/10.1109/PTC.2011.6019248>

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Robust frequency control for a wind/hydro autonomous microgrid

2 Author(s) C. Marinescu ; I. Serban View All Authors

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Abstract

Document Sections

I. Introduction

II. System Configuration

III. MG Frequency

Abstract:

This paper presents a robust frequency control method for autonomous small-scale microgrids (MG) based on hydro and wind powers. The proposed solution includes a smart load (SL) on the control side, which acts on the MG power loading to maintain the frequency constant. The thermal energy produced by SL is used for the local consumers. An isochronous frequency controller is optimally designed and the proposed control technique is validated by experiments on a laboratory test-bench. The study was focused on frequency control under variable load and wind power, and the experimental results showed that the proposed solution provides good results, the MG frequency being kept in a narrow band. The system is also investigated under overload conditions, when a load-shedding method overcomes the system outage.

4. <https://doi.org/10.1109/OPTIM.2012.6231960>

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An enhanced three-phase battery energy storage system for frequency control in microgrids

2 Author(s) I. Serban ; C. Marinescu View All Authors

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387 Full Text Views



Abstract

Document Sections

I. Introduction

II. Proposed BESS

Abstract:

This paper presents a three-phase battery energy storage system (BESS) operating in both microgrid (MG) connected and islanded modes. When connected to the MG, an enhanced frequency controller, covering the main two frequency control levels, i.e. primary and secondary, governs the BESS active power. If the MG power quality worsens below a certain level, the system is able to switch in island mode and to supply the local loads. The reconnection is accomplished only after the BESS voltage is smoothly resynchronized with the MG voltage. The proposed control solution for a three-phase BESS is assessed by means of computer

5. <https://doi.org/10.1109/PEDG.2012.6254029>

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Analysis and optimization of the battery energy storage systems for frequency control in autonomous microgrids, by means of hardware-in-the-loop simulations

3 Author(s) I. Serban ; R. Teodorescu ; C. Marinescu [View All Authors](#)

7
Paper
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Abstract

Document Sections

1. Introduction

II. MG Real Time

Abstract:

This paper presents an original hardware-in-the-loop (HIL) solution for real-time testing and optimization of the frequency control mechanism in autonomous microgrids (MG), when battery energy storage systems (BESS) are integrated along classical and RES-based generators to stabilize the frequency. The focus is on autonomous MGs that dynamically should perform similarly to the conventional power systems. During MG autonomous operation, the generators should accomplish the frequency control process, by means of their

6. http://webbut.unitbv.ro/BU2009/BULETIN2009/Series%20I/Contents_I_EEEA.html

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About the main frequency control issues in microgrids with renewable energy sources

2 Author(s) C. Marinescu ; I. Serban [View All Authors](#)

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Abstract

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Abstract:


This paper provides a brief look over the main frequency control issues related to the operation of microgrids with renewable energy sources. Starting from the regulation of the classical power systems regarding the frequency control, the MGs can use similar control techniques adapted to the typical units that can be found

11. <http://elth.ucv.ro/fisiere/anale/2007/13.pdf>

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Flexible solution for grid-connected operation of microgrids, based on a leading inverter with supercapacitor energy storage

2 Author(s) Ioan Serban ; Corneliu Marinescu [View All Authors](#)

32 Full Text Views



Abstract

Document Sections

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Abstract:

This paper proposes a control solution for connecting microgrids (MGs) to the utility grid. An MG-leading inverter (MGLI) incorporating a supercapacitor energy storage system (SC-ESS) coordinates the MG, in both grid-connected and autonomous mode. Focusing on the grid-connected operation, this paper shows that, by the proposed control mechanism, a precise control of the power exchange with the grid can be obtained. An

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Harmonic compensation with active loads designed for power quality improvement in microgrids

1 Author(s) Ioan Serban [View All Authors](#)

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Abstract

Document Sections

1. Introduction

Abstract:

Ensuring a proper power quality level in microgrids (MGs) represents a major challenge and requires exploiting most of the MG available resources. An important measure consists in modifying the interaction of conventional consumers with the MG, thereby aiming to the development of active loads (ALs). Besides voltage and frequency support, an AL can provide harmonic compensation (HC) according to its operational

16. <https://doi.org/10.5220/0006799205950599>

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Development of the web platform for management of smart charging stations for electric vehicles (Conference Paper)

Komasilovs, V.^a, Zacepins, A.^a, Kviesis, A.^a, Marinescu, C.^b, Serban, I.^b

^aDepartment of Computer Systems, Faculty of Information Technologies, Latvia University of Agriculture, Jelgava, Latvia

^bDepartment of Electrical Engineering and Applied Physics, Transilvania University of Brasov, Romania

Abstract

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Shortage of fossil fuels and ecological thinking leads to shift in technologies for vehicle production. In the future only electric vehicles (EVs) would be produced. This will lead to huge increase in number of EVs worldwide, so it would be crucial to provide a broad public charging infrastructure. This paper exactly concentrates on the essential role of infrastructure in the mass implementation of electric vehicles. A focus is placed on sharing the residential infrastructure for public usage. Paper describes authors developed Web platform for sharing the information about privately owned charging stations, describing the additional option to link station hardware with software for real-time charging data and station availability updates. Developed platform

17. <https://doi.org/10.1109/PEMWA.2009.5208400>

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Analysis of frequency stability in a residential autonomous microgrid based on a wind turbine and a Microhydro power plant

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Configuration

Abstract:

This paper focuses on the analysis of frequency stability in an autonomous microgrid (MG) with renewable energy sources (RES), mainly wind power. Frequency control is directly related to the active power balance in the system. When RES are involved the generated active power is difficult to predict, and may have fluctuations mainly in the case of wind power plants. Therefore, the autonomous MGs have to be able to manage fast the active power flow, even when the generated power is less than the loads demand. This paper investigates a new control solution for maintaining the frequency stability in the MG, by using a combination of an energy storage system and a dump load. The solution is evaluated by experimental

18. <https://doi.org/10.1109/SPEEDAM.2006.1649828>

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Controlling a stand-alone power system

5 Author(s) C. Marinescu ; C. Ion ; I. Serban ; L. Clotea ; D. Marinescu [View All Authors](#)

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Abstract

Document Sections

[I. Introduction](#)

[II. System
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[III. Simulation results](#)

Abstract:

This paper deals with a hybrid power system based on renewable energy sources, working in stand-alone mode. It consists of a micro-hydro plant including a synchronous generator and a wind turbine with an induction generator. A frequency controller, based on dump load and common voltage regulator for the two generators, ensures the system's power balance. The study -including simulations- focuses on two main aspects: the power quality, and the system's behavior under unbalanced loads and its response to a severe fault

Published in: [International Symposium on Power Electronics, Electrical Drives, Automation and Motion,](#)

19. <https://doi.org/10.1109/IECON.2005.1569308>



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Controlling variable load stand-alone hydrogenerators









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Abstract

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Abstract:

The paper aims to establish a common way in controlling the electric energy quality in micro hydro plants. The considered situation deals with the stand alone synchronous and induction generators. The research investigates a power control scheme that would allow avoiding the mechanical control of the turbine. For the control study, simulations were made for variable loads. The considered control circuit performs the voltage and frequency regulation, separately and together, for both types of generators.

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20. <https://doi.org/10.1109/ICCEP.2017.8004831>

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Modified MPPT control for small wind turbines to provide dynamic frequency support in islanded microgrids

3 Author(s) [I. Ducar](#) ; [C. Marinescu](#) ; [I. Serban](#) [View All Authors](#)

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Abstract

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Abstract:
This paper presents an analysis of the main maximum power point tracking (MPPT) methods used for small wind turbines, from the perspective of providing dynamic frequency support in islanded microgrids (MGs).