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FUZZY LOGIC CONTROLLER BASED OPTIMIZATION OF FLOW OF ENERGY IN BATTERY STORAGE SYSTEM

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Abstract

In the past, many algorithms were proposed. This investigation presents a plan for a Battery Management System (BMS) and is a new method for restoring transient stability by modeling the energy storage system based on optimal control of energy flow by using the controller based on fuzzy logic. To achieve this, it has been reducing the multi-machine model to an equivalent machine. The benefit of developing such a model is that the control details of multiple machines can be in time and merged into a single model with low complexity. The proposed method can be used to send and forward energy, while transient stability restrictions have been exhausted. In addition, the work presents a statistical comparison with existing dynamic stochastic methods to meet the demand of BMS energy, using the energy storage system will be more efficient while determining energy storage. The implementation of BMS, inefficiency and waste in the electricity grid can be reduced.

Keywords: *Battery management system; Transient Analysis; Energy storage; Fuzzy logic.*

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1. Introduction

Many important problems affect electrical power systems today. According to the literature, the problems presented include increased level of inefficiency, environmental awareness, reliability problems, economic growth, increased demand, new matching fees (induction cookers, electric vehicles) and new flexibility requirements. These problems are noteworthy adequate to demand significant changes in the scheduling and operating viewpoint of energy systems. The energy storage system shown sufficient to overcome these problems by creating an entire electricity grid and harmonizing and improving demand. Batteries are attributed of being dynamic in nature and owing to its continual functioning outside state of equilibrium amid the complete cycle of charge and discharge. Generally, even-under typical operation the battery stacks of the BESS tend to lose its performance amid going through the process of cyclic recharge.

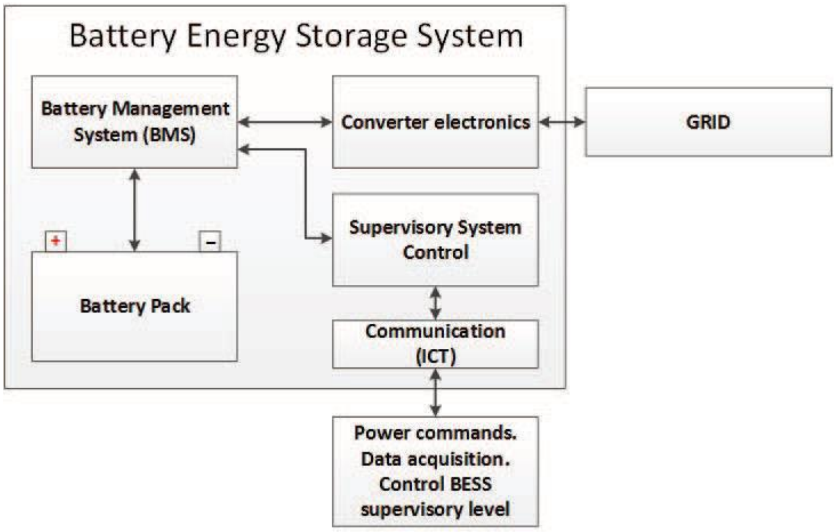


Figure 1. BESS centralized architecture

2. Method and Optimization

In this work, a method has been proposed to optimize the variable or parameters which is carried out by time simulation of battery management system for series or network battery system. This battery system stacks the data and used to optimization process. The fuzzy logic controller-based optimization has been used in this work to optimized using controlling the energy supply. The work has been done in Matlab software.

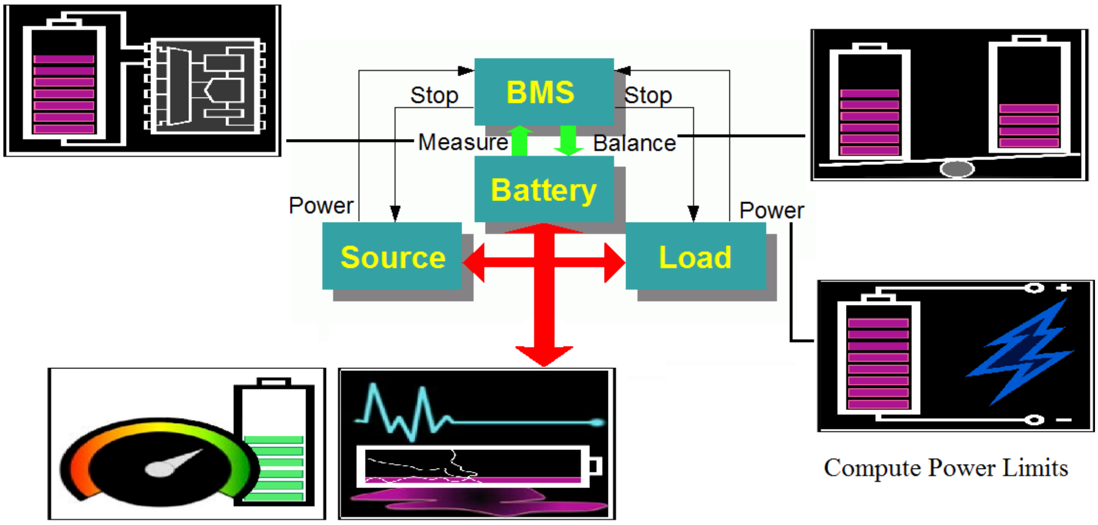


Figure 2. A data flow diagram of the proposed battery management system

3. Result and Discussions

As we know that the optimization problem concerned with power flow is referred to as non-convex. Thus, the outcome is heavily dependent on intuitive guises; such that this leads us not to use neural network-based prediction model for solving optimization problem in this domain.

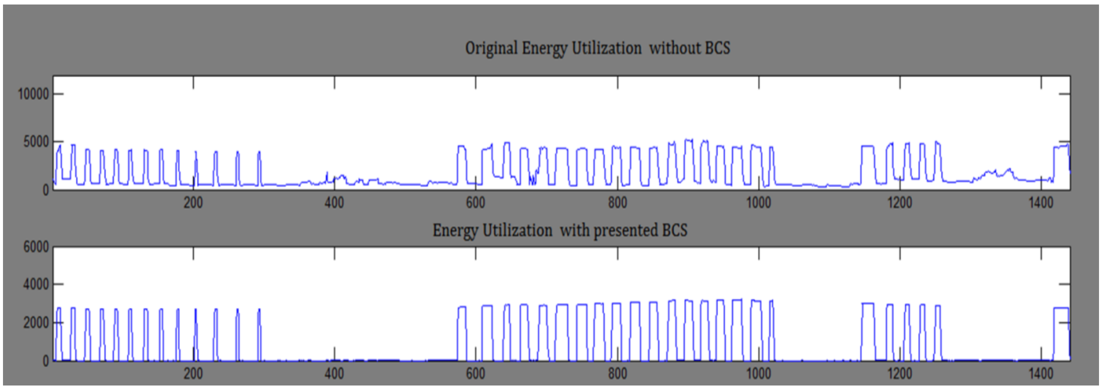
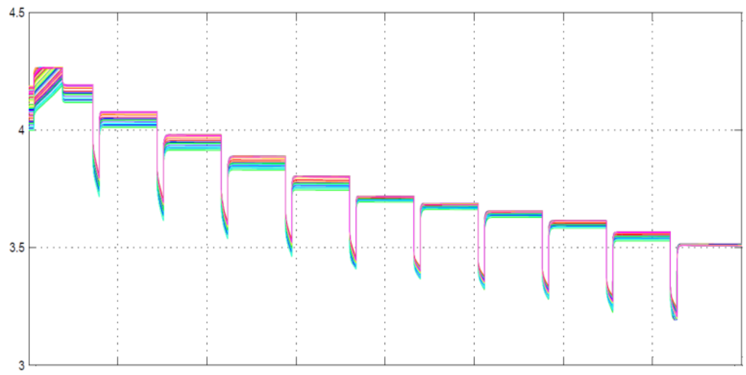
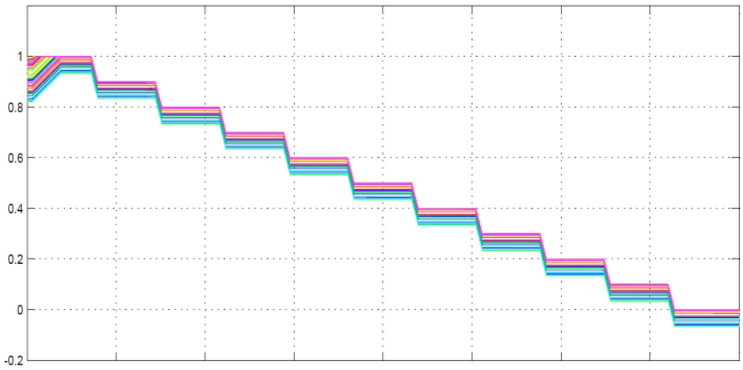


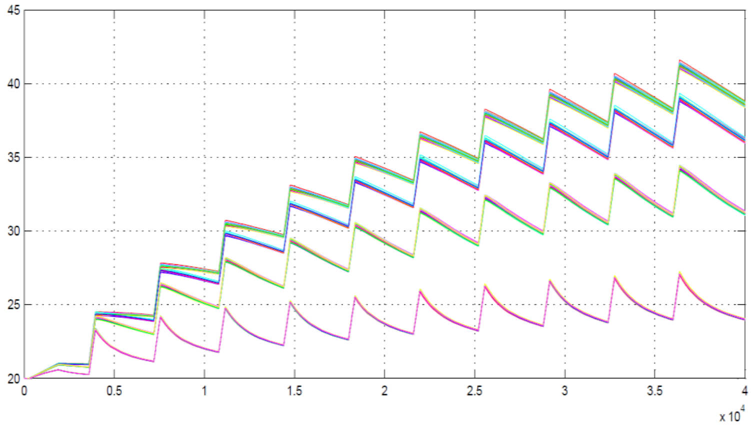
Figure 3. Graphical representation of the energy conservation



(a)



(b)



(c)

Figure 4. Graphical representation for 80 battery stacks in all the three cases of variation of transient stability.

Figure 3 and Figure 4 (a-c) represented that the simulation model or results obtained after simulation which has been represents the continuous power used in the regular power setting that provides the reduction in power consumption by dynamically adjusting the flow of power with storage device and main grid lines.

4. Conclusions

Models that record for various stacks are mandatory to perform ideal control of the separate battery stacks in realizing these prescient models through the BMSs and the BESSs, these devices for energy storage can be a great deal for more keeping the grid system protected and productive in adverse conditions. Battery models for Li-particle systems had advanced, however numerous higher precision-based models create substantial computational loads and require long computational time for the simulation that are not reasonable for control and usage into constant BMSs. While making BMSs for vast grid systems, numerous battery stacks and separate BMSs must be interfaced with one another in order to achieve a specific end goal of free from any limits.

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