

How does modularity support the design of Li-ion batteries?

A modular approach to support the design of Li-ion batteries. The case study describes a battery module with Li-ion cells type 18650. Simulations and the design approach are focused on one battery module. The modularity is extended to the layout of the cooling system. The cooling system consists of a passive PCM and an air-cooling system.

What is a battery module?

The battery module is the smaller operative unit that includes its cooling system. A modularization approach is introduced during the design activity to achieve important targets in terms of assembly and thermal management. Here modularity is proposed as a key to reducing cost and increasing battery performance.

What is modularity in battery design?

The resulting battery's module is defined considering the functional requirements highlighted in the early design phase. This activity is proposed to support a better modularization of the whole battery pack. The modularity in battery design can be applied both in customized production and mass production.

How can a fully modular power electronic architecture improve battery design?

Moreover, different legal rules would apply for certain aspects of the battery design such as insulation. Moreover, a further increase of flexibility could be reached by a fully modular power electronic architectures, e.g. modular inverters and machines.

How a modularized BMS is used in a 6s1p battery balancing system?

The modularized BMS used in the proposed system is based on the research conducted in [1], where all the monitoring, active cell balancing, and protection functions are implemented for 6S1P battery modules. Fig. 4 displays a block diagram of an active cell-balancing system based on a bidirectional converter.

What is a modular global architecture for battery balancing?

In [2], Shang et al. proposed a modular global architecture using multiwinding transformers for battery cell balancing. The architecture caused the cell with the highest capacity to transfer the extra energy to other cells in the whole pack.

This battery modularization scheme effectively reduces the number of cells that we consider in an equalizer design procedure; thus, the design of a charge equalizer becomes much easier. Furthermore, by applying the previously verified charge equalizers to the intramodule and the outer-module, we can make the equalizer design more flexible.

In this method, a very long battery string is divided into several modules, and then, an intramodule equalizer and an outer-module equalizer are designed. This battery modularization scheme ...

A kind of modularization energy-storage lithium battery structure of fast demountable of the present invention, including three kinds of band CECU energy-storage lithium batteries module, standard energy-storage lithium battery module and cut-off end energy-storage lithium battery module. Band CECU energy-storage lithium batteries module is connected with outer connector ...

The modularization battery module shell comprises a plurality of brackets, electrical connection pieces and a plurality of insulation frames, wherein the brackets are arranged in the back-forth direction, are arranged side by side and are connected in a buckling manner; a containing space for containing a battery is defined between every two ...

The utility model provides a kind of modularization assembling battery case, it include: framework module, the framework module is one or more layers, every layer of framework module is made of the side framework that bottom is supported and is vertically arranged in the bottom support, the space for accommodating battery is formed between the bottom support and the side ...

The invention discloses a kind of electromobile modularization quick-change power battery unit, main body is several identical battery cores; The protrusion that extends outwardly in the middle part of the opposite both sides of every piece of battery core forms positive pole ear and negative lug. The both ends of battery core are fixed in two vertical support plates by positive pole ear ...

Battery balancing during charging of a varying number of battery modules, as well as other charging protocols such fast and/or fast charging, can be used to provide modularity by...

This paper addresses a modularized two-stage active cell balancing topology based on an improved buck-boost converter for a series connected Lithium-ion battery string. The proposed topology has a modular structure, each module consisting of three cells, two inductors, and four MOSFET switches. This technique provides module-to-module balancing in the first stage. ...

The battery balancing system is based on battery pack modularization architecture. The proposed modularized balancing system has different equalization systems that operate inside and outside...

The main purpose of this study is to design a dual-concentration BMS for a high-count series battery system with the following advantages. First, the dual-concentration BMS ...

A modularization method is proposed for this topology with two additional passive elements per module. This method provides a direct charge transfer path from any cell in one module to any cell in another module. Thus, the equalization time does not increase with the number of modules.

The proposed battery module balancing circuit contains a modified flyback converter with an active clamp, as displayed in Fig. 8, where N is the turn ratio of the transformer; I_1 is the current extracted from the battery

pack; I_2 is the battery module balancing current; L_m is the magnetizing inductance of the transformer; S_{bmk} is the MOSFET array; Q_1 is the ...

To overcome these difficulties, we propose a charge equalizer design method based on a battery modularization technique. In this method, a very long battery string is divided into several ...

The modularization of battery packs for grid-scale applications reduces the number of series-connected cells, lightens the load on battery management systems, and improves their ...

The utility model provides a kind of modularization battery, and the modularization battery is formed by connecting by some battery modules; It is joint face between the battery module of two adjacent connections, the corresponding connecting groove in position and wiring hook is provided with the side of the battery module joint face; Connecting groove between the two ...

PROBLEM TO BE SOLVED: To provide a method for updating module information in battery modularization structure. SOLUTION: The method for updating module information in battery modularization structure is a method for updating lower module information in the battery modularization structure in which an upper controller controls and manages a lower module ...

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