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Symmetry in Power Battery Management Systems

Guest Editors:

Prof. Dr. Yunlong Shang
School of Control Science and Engineering, Shandong University, Jinan 250061, China

Dr. Jufeng Yang
Automotive Engineering Research Institute, Jiangsu University, Zhenjiang 212013, China

Dr. Qi Zhang
School of Control Science and Engineering, Shandong University, Jinan 250061, China

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Message from the Guest Editors

Dear Colleagues,

Batteries have been widely used as important energy storage components in many applications, such as portable electronics, electrical/hybrid transportations, smart grids, etc. It is estimated that the global lithium-ion battery market will exceed USD 100 billion by 2025. In addition to tremendous progress being made in relation to battery materials, development of efficient, reliable, and low-cost battery management systems (BMSs) has been an emerging and challenging research topic in recent years. The study of power battery management system is closely related with symmetry. For example, the topology and control algorithm of battery balancing system are inherently symmetric, and the study of symmetrical and asymmetrical faults in the battery pack level is a significant issue. The use of intelligent BMSs can effectively facilitate battery operation in the high-efficient region and significantly improve the fault-tolerant characteristic of the system. The key technologies of BMSs include battery modeling, state estimation, cycle life prediction, fault prognosis and diagnosis, balancing control, charging control, heating technology at low temperatures, etc...

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Editor-in-Chief

Prof. Dr. Sergei D. Odintsov
1. Institució Catalana de Recerca i Estudis Avançats (ICREA), Passeig Luis Companys, 23, 08010 Barcelona, Spain
2. Institute of Space Sciences (ICE-CSIC), C. Can Magrans s/n, 08193 Barcelona, Spain

Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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Contact Us

Symmetry Editorial Office
MDPI, St. Alban-Anlage 66
4052 Basel, Switzerland

Tel: +41 61 683 77 34
www.mdpi.com

mdpi.com/journal/symmetry
symmetry@mdpi.com
𝕏@Symmetry_MDPI