

Message from Editors

CURRENTLY, new technologies and applications are presenting both new challenges and new opportunities to the field of electric machines and motors. The continual dedicated effort of researchers is required to achieve the high-performance and high-reliability of electric machines while ensuring their cost-effectiveness. In motor design, with the advancements of optimization theory and technology, increasingly effective methods have been developed for the design of motors, especially for the ones with complex electromagnetic structures. The continuous advancements of computer technology and big data technology have also enabled optimization technologies to be realized in motor design, previously thought to be too complicated to utilize. These have also promoted the advancement of optimization technology and the development of new types of motors with unique electromagnetic structures. In terms of motor control, the power losses are constantly decreasing while the chopping frequency is constantly increasing in new semiconductor power devices. The calculation capability of micro processor is increasing, and the continuous improvements of new sensors and communication technologies have rendered these technologies to be absorbed in electric machine systems. All these advancements have led to the superior performances of an increasing number of motor control technologies, while also enabling previously untapped control theories and techniques to showcase their potential today. These have further promoted the development of motor control theory. Some of the new technologies mentioned are highlighted in this special issue of the journal. The motor domain is certainly in an exciting era now, with new advancements emerging constantly.

The purpose of this special issue is to highlight the latest research in two areas of widespread concern: optimal design of motors and robust control. However, due to the impact of COVID-19, the journal encountered many difficulties in the process of paper submission, consolidation and review in the first quarter of 2020. Fortunately, with the valuable support and help of many researchers and experts, we have finally completed this special issue.

Due to time constraints and other factors, this issue is only able to showcase five papers for the special issue and three papers for regular issue from many papers submitted. These papers reflect some of the most anticipated advancements in motor optimization and control.

I would like to take this opportunity to thank the authors and reviewers for their support and understanding throughout the submission and review of the papers. It is my hope that through this special issue published in the special period of 2020, readers can feel that even in this challenging time, motor technology remains on an upwards trajectory. This is an exciting field that gives people much hope and strength - after every storm, the sun always shines!

Professor Chao BI
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Professor Chao BI received his bachelor degree from Hefei University of Technology in 1982, master degree from Xi'an Jiaotong University in 1984 and doctor degree from National University of Singapore in 1994. He has worked for many years in Western Digital, National University of Singapore, and Agency for Science, Technology, and Research (A*Star) of Singapore. He was a senior engineer in Western Digital, senior scientist of A*Star, adjunct Professor of National University of Singapore. He is also the senior member of IEEE. He is currently a professor of University of Shanghai for Science and Technology, and the adjunct professor of several other universities. He is also the CTO of Fortior Technology for developing the IC chip of motor drive.

Professor BI Chao has published one technical monograph and more than 180 papers. As the achievements in high performance motors, he was awarded the National Technology Award of Singapore in 2006 (NTA-2006). His research results are widely used in industrial and domestic products, information storage, biomedical electricity, storage technology and defense related fields. In recent years, he has been concentrated in the R&D of high performance motor technology, including high performance motor electromagnetic structure design, ultra-high speed motor technology, micro-motor technology, drive control, control chip, and motor application. The research scope covers motor theory, motor engineering, drive system, electromagnetic field technology, optimization technology, IC chip design, bioengineering and energy engineering.

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