

FOREWORD

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Instrumentation and control technologies are basic technologies that hold important keys to the development and stable manufacture of high value-added products and the solution of various social problems. The JFE Group has determined the missions which it should accomplish in connection with diverse issues and is working to find solutions that utilize instrumentation and control technologies. These issues range from new product development, innovation and improvement of production and logistics, and improvement of quality and delivery, in other words, “improvement of customer satisfaction,” to global environmental problems, response to aging equipment and transmission of technology and skills to the next generation, which are related to “maintenance/development of manufacturing infrastructure for Monozukuri,” and “realization of a safe and secure society.”

On the other hand, as a means for solving those problems, we have achieved astonishing progress in the last 10 years, and have put a large number of new technologies into practical application. Examples include analysis of big data for high speed processing and collaborative use of the qualitatively and quantitatively enormous volume of digital data resulting from application of advanced information technologies to manufacturing processes and its application technologies, development of a wide variety of optimization algorithms, and application of sensing and monitoring technologies as well as development of related devices, which are also evolving rapidly.

The JFE Group has promoted strategic research and development and practical application of instrumentation and control technologies based on such trends in the fields of iron and steel, engineering, maintenance and equipment diagnosis. This special issue introduces examples of that development and some products. In the control and systems field, the use of just-in-time modeling, mathematical programming techniques and other types of large volume data and large-scale computations has been developed to a wide range of fields, and high accuracy quality control and high efficiency logistics have been realized. Examples of process control technologies in steel manufacturing and logistics optimization technologies are described. In the instrumentation field, based on the development of new

devices and signal processing technologies, we have developed unique measurement principles and realized sophisticated measurements and quality inspections that had been difficult in the past. Examples of the application of various types of surface inspection technologies, nondestructive inspection technologies and image recognition technologies are reported. In the field of equipment diagnosis, in addition to the deployment of the above-mentioned technologies, remote control and wireless technologies have also progressed. Remote control/monitoring systems in plants, diagnosis technologies for electrical equipment, and other new technologies are introduced.

The JFE Group has adopted “Contributing to society with the world’s most innovative technology” as its corporate vision, and not only strives to supply safe, high quality products and services, but also to collaborate and cooperate with society and to coexist in harmony with the global environment. Making full use of our total capabilities, we will also actively promote the development of instrumentation and control technologies in the future, and we will respond continuously to the increasingly high order needs of our customers and society. In publishing this special issue, we will hope to receive guidance and opinions from all quarters.