Machine tools using numerical control (NC) devices are typical mechatronics products, and introducing them is a powerful way to automate plant production. NC machine tools in workshops meet the requirements of high accuracy and efficiency in the machining of a variety of parts and mold dies.

Turning centers and machining centers are typical examples of such machine tools. Various cutting processes have been integrated in them to cope with the increase in machine parts that not only have complicated geometries but also must be made with high accuracy, in small quantities, and in a short machining time. In addition, turning and machining centers have been given multitasking capabilities, and the number of control axes has been increased so that complex products may be manufactured efficiently.

Given that the strong attention and interest in multiaxis control and multitasking machine tools are rapidly increasing, it is fitting that the current state of the art of these tools and their practical and applicable technologies be presented.

This special issue features 16 research articles – one review and 15 papers – related to the latest research results and practical case studies in multiaxis control and multitasking machining. Their subjects cover various advances in machine control, motion accuracy evaluation, machining error analysis, chatter vibration monitoring or suppression, trouble-free tool path generation, process planning, and new applications of the machine tools.

We thank the authors for their contributions to this special issue, and we are sure that both non-specialists and specialists alike will find the information the authors provide both interesting and informative. Moreover, we deeply appreciate the reviewers for their incisive efforts. Without these contributions, this special issue could not have been realized. We truly hope that this special issue will trigger further research on multiaxis control and multitasking machining.