Preface

This volume is a collecting scientific results of several researchers in the fields of prediction and handling of interactions between structure and process. Research programs have the primary objective analysis of the interactions between processes and structures in modern production facilities.

This book presents the results of several interdisciplinary projects, focusing on different manufacturing processes such as high speed machining or metals forming. It contains experimental studies and mathematical modeling of production processes and the interactions of the machine. New advanced experimental and innovative simulation approaches are also included.

The research topics are mainly analytical and numerical modeling of processes and development of advanced algorithms adapted to the simulation of manufacturing processes and the behavior of mechanical systems. Numerical modeling of the processes shaping composite cutting and high speed cutting (with different scales of analysis). Experimental methods of analysis associated physical mechanisms, identification and validation.

Development of advanced algorithms and suitable for non-linear problems, multi-physics and multi-scales for shaping metals, polymers, composites, ceramics, and mechanical systems including their control. Main characteristics: development of finite element models to specific structures, methods meshless natural element type for the treatment of general problems of thermomechanical model reduction techniques allowing significant gains in computation time, multi-scale layout metals and polymers.

Process monitoring is a relatively recent phenomenon in the broad field of monitoring and evaluation. Process monitoring is a relatively recent phenomenon in the broad field of monitoring and evaluation. It provides a means of assessing the health field and guarantee the quality of manufacturing. It is a tool for institutional learning and take corrective action in innovative projects and adaptive. Experience in monitoring the process focuses on different areas.

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