Application Strategies of Robust Design & Complexity Management in Engineering

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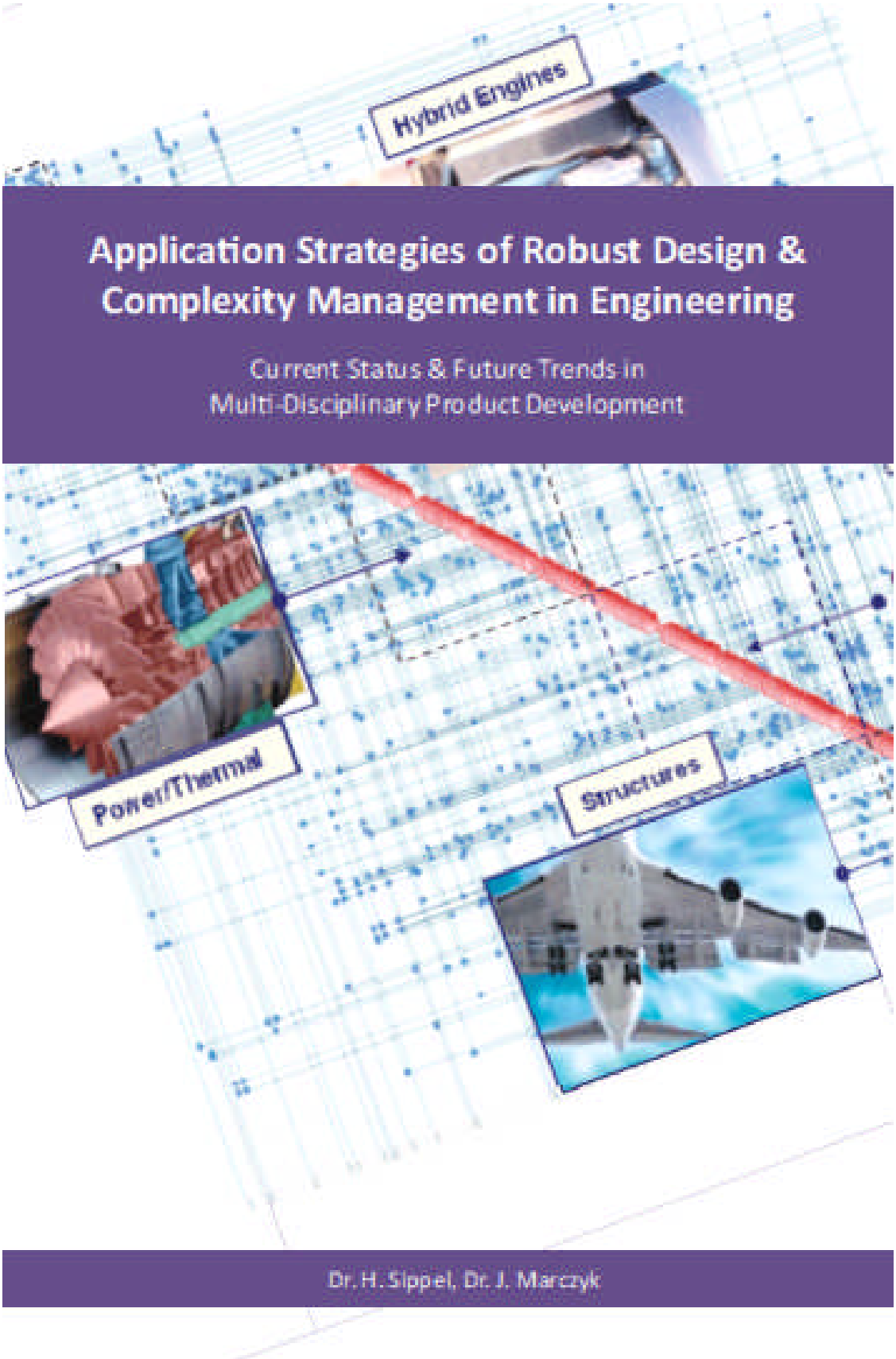


# Application Strategies of Robust Design & Complexity Management in Engineering

## Current Status & Future Trends in Multi-Disciplinary Product Development

Dr. H. Sippel, Dr. J. Marczyk

# EXECUTIVE SUMMARY

## The basic questions to answer: Which messages should be transmitted by this book?

***Firstly***, the book entitled

**Application Strategies of Robust Design & Complexity Management in Engineering, Current Status and Future Trends in Multi – Disciplinary Product Development**

does not claim to be a scientific text – book per se.

In fact it should contribute to make the understanding and application strategies of "**Robust Design and Complexity Management"** tools more tangible in the assessment of re-designs and new designs concepts in a multi – disciplinary world.

The trend to articulate product offering is putting pressure on manufacturing companies like never before. Therefore, the complexity of modern products and of the associated manufacturing processes is rapidly increasing. High complexity, as we know, is a prelude to vulnerability. It is a fact that in all spheres of social life excessive complexity leads to inherently fragile situations. Humans perceive this intuitively and try to stay away from highly complex situations. But can complexity be taken into account in the design and manufacturing of products? The answer is affirmative. Recently developed technology, which allows engineers to actually measure the complexity of a given design or product, makes it possible to use complexity as a design attribute. Therefore, a product may today be conceived and

designed with complexity in mind from day one. Not only stresses, frequencies or fatigue life but also complexity can become a design target for engineers. Evidently, if CAE is to cope with the inevitable increase of product complexity, complexity must somehow enter the design-loop. This book is about using complexity to design more robust products and processes and has the objective of introducing the subject to a wide engineering audience.

***Secondly***, within the Environment of Multi – Disciplinary engineering it highlights the outcome and objectives of publically funded projects and initiatives like the EC funded projects AUTOSIM and VIVACE as well as ASC(S.

In that context also the "currently in use" Simulation Technology and corresponding Infrastructure will be described as well as "Design – To – Cost" considerations.

***Thirdly*** Robust Design and Complexity Management will be described by "case studies" which prove their efficiency.

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