

Tutorial 1

Axiomatic Design: An Introduction and Perspectives with Recent Advances

Fundamental principles of Axiomatic Design (AD) are reviewed, with insights and perspectives of over 30 years of teaching and practice. This should be of interest to beginners and to all levels of users. The latest methods for using AD, qualitatively and quantitatively, for selecting the best design solutions and for fostering innovations are presented. AD, originating with Nam Suh at MIT in the late 1970s, contends that all good designs comply with two axioms: maintaining independence of the functional elements and minimizing information content. AD can add value and reduce costs in designs and in the design process. Emphasis is placed on techniques for decomposing design problems into valid, corresponding functional and physical hierarchies, and using metrics, to facilitate rigorous application of the axioms.

This tutorial is intended design practitioners and students, who might have never used Axiomatic Design, or who would like a fresh perspective. It would also be useful for people who would like to see this approach to teaching AD.

Tutor:

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In 1983 Brown earned his PhD at the University of Vermont where he learned about Axiomatic Design from Nam Suh. He then spent four years as a scientific collaborator in the Materials Department at the Swiss Federal Institute of Technology. For two years he was a senior research engineer designing product and processes at Atlas Copco's European research center. Since the fall of 1989 Chris has been on the faculty at WPI. Chris has published over a hundred articles on axiomatic design, sports engineering, manufacturing processes, and surface metrology. He has patents on a fractal method for characterizing surface roughness, an apparatus for friction testing, and on sports equipment. He teaches grad courses on axiomatic design of manufacturing processes, and on surface metrology, and an undergraduate course on the technology of alpine skiing. He also consults, and teaches courses, for industry on axiomatic design and on surface metrology.