1. Record Nr. UNISANNIOBVE0049931

Autore	Montrone, Alessandro
Titolo	Analisi e controllo della gestione d'impresa : il sistema delle fasce d'allarme / Alessandro Montrone ; prefazione di Gianfranco Cavazzoni
Pubbl/distr/stampa	Torino, : G. Giappichelli, [1993]
ISBN	8834840216
Descrizione fisica	244 p. ; 24 cm.
Soggetti	Aziende - Gestione - Controllo
Collocazione	POZZO LIB.ECON MON 9008
Lingua di pubblicazione	Italiano
Formato	Materiale a stampa
Livello bibliografico	Monografia

2. Record Nr. UNINA9911006804903321

Autore	Benavides Efren Moreno
Titolo	Advanced engineering design : an integrated approach / / Efren Moreno Benavides
Pubbl/distr/stampa	Cambridge, : Woodhead Pub., 2012
ISBN	9781613447918 1613447914 9780857095046 0857095048
Edizione	[1st edition]
Descrizione fisica	1 online resource (283 p.)
Collana	Woodhead Publishing in mechanical engineering Advanced engineering design
Disciplina	620.00425 620.0042
Soggetti	Engineering design
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.

Nota di contenuto

Cover; Advanced engineering design: An integrated approach; Copyright; Dedication; Contents; List of figures and tables; Figures; Tables; Acknowledgments; About the author; 1The design process; 1.1 The concept of design and related terms; 1.2 Design as a value-generating process in society; 1.3 The goal of design theories; 1.4 Background; 1.5 The scope of design theories; 1.6 The definition of design; 1.7 The characteristics of design; 1.8 Design problem; 1.9 Activities in the design process; 1.10 Information management; 1.11 The design process as a product
1.12 The importance of the design process1.13 The importance of Design Science; 1.14 Notes; 2Information, entropy and its relationship to design; 2.1 The design process in terms of probabilities; 2.2 Definition of design; 2.3 Uncertainty; 2.4 Entropy; 2.5 Joint entropy, conditioned entropy and relative entropy; 2.6 Mutual information; 2.7 Upper and lower bounds of mutual information. Information content of a variable; 2.8 Process information; 2.9 Spaces of definition: need-solution-response-satisfaction; 2.10 Degree of satisfaction; 2.11 Conceptual and detailed design
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4.3 System design and parameter design4.4 Tolerance design; 4.5 Robust design; 4.6 Cost-effectiveness of advanced design techniques; 4.7 Example application; 4.8 Notes; 5Reliability-based design; 5.1 Objective of reliability calculations; 5.2 Definition of reliability; 5.3 Calculating the probability of failure; 5.4 First-Order Reliability Model (FORM); 5.5 Semi-empirical reliability model; 5.6 Example application: influence of radial clearance on bearing life with a surface fatigue failure mode; 5.7 Notes; 6Entropy-based design; 6.1 The Minimum Tolerance Theorem; 6.2 The Linearity Theorem
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Sommario/riassunto

This book provides engineers and students with a general framework focusing on the processes of designing new engineering products. The procedures covered by the framework lead the reader to the best trade-offs to ensure maximum satisfaction of the customer's needs, meeting the lowest cost expectations, ensuring the lowest environmental impact and maximising profits and best positioning in the marketplace. Chapters discuss the engineering tools that are compatible with these goals and sustainable activity.The design process is defined in terms of operators acting over the infor