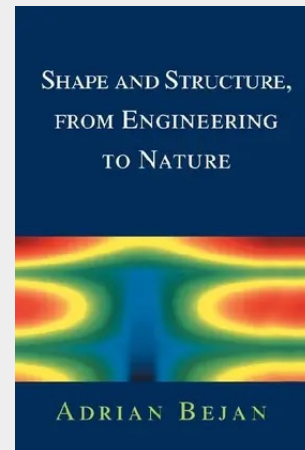


Shape and Structure, from Engineering to Nature

Seemingly universal geometric forms unite the flow systems of engineering and nature. For example, tree-shaped flows can be seen in computers, lungs, dendritic crystals, urban street patterns, and communication links. In this groundbreaking book, first published in 2000, Adrian Bejan considers the design and optimization of engineered systems and discovers a deterministic principle of the generation of geometric form in natural systems. Shape and structure spring from the struggle for better performance in both engineering and nature. This idea is the basis of the new constructal theory: the objective and constraints principle used in engineering is the same mechanism from which the geometry in natural flow systems emerges. From heat exchangers to river channels, the book draws many parallels between the engineered and the natural world. Among the topics covered are mechanical structure, thermal structure, heat trees, ducts and rivers, turbulent structure, and structure in transportation and economics. The numerous illustrations, examples, and homework problems in every chapter make this an ideal text for engineering design courses. Its provocative ideas will also appeal to a broad range of readers in engineering, natural sciences, economics, and business.

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238,90 €

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Lieferfrist: bis zu 10 Tage

Artikelnummer: 9780521790499

Medium: Buch

ISBN: 978-0-521-79049-9

Verlag: Cambridge University Press

Erscheinungstermin: 09.12.2010

Sprache(n): Englisch

Auflage: Erscheinungsjahr 2010

Produktform: Gebunden

Gewicht: 876 g

Seiten: 362

Format (B x H): 183 x 260 mm

