

# 推荐一本关于BREP几何入门书籍

邓子平 [多物理场仿真技术](#)




不少朋友来信问有没有关于三维几何BREP方面的书籍。推荐一本英文书籍，写的比较早，但几乎涵盖了三维几何BREP的所有内容，也是笔者之前开发的参考书，非常适合入门和参考。

Boundary Representation Modelling Techniques by Ian Stroud (EPFL), STI-IPR-LICP

Ian Stroud

# **Boundary Representation Modelling Techniques**

 Springer

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This book is concerned with aspects of boundary representation (B-rep) solid modelling, describes several algorithms illustrating both general principles of modelling algorithms and their versatility and outlines the general principles behind the development of such algorithms and the extensions for handling information in models. It goes on to describe feature modelling, graphics, model input and output, and applications. It represents a collection of work partly by the author but also by many other people whose results are described.

The purpose of the book is not to give a general introduction to solid modelling. A variety of techniques are available and to go into detail about each one would require much more space than is reasonable. This book attempts to cover basic techniques for one branch. It is not intended to be a review of commercial systems nor to describe any one system. The aim is to describe the techniques behind different systems.

The first two chapters describe the background to solid and product modelling and what has already been done. Chapter 1 gives a brief outline of computer modelling, and chapter 2 describes in more detail the background to B-rep modelling specifically, because this forms the basis for the book.

Chapter 3 describes an idealised, or recommended B-rep modelling environment, the basic operations or tools that provide a basis for the work described in the book. This idealised representation can be implemented in several ways, so the chapter first describes the various options and the basic datastructures available when designing a modelling system. Datastructure definitions of the B-rep entities are described in Appendix A. The chapter goes on to identify and describe various basic tools, i.e. elementary modelling operations, which provide a uniform functional shell surrounding any particular implementation. Chapter 4 also describes basic tools, the Euler operators, and the theory behind decomposition of modelling operations into sequences of Euler operators. Chapter 5 describes variations on the basic datastructure, the non-manifold, degenerate, and partial object representations.


Chapter 6 describes several modelling algorithms for manipulating B-rep models, including modelling with degenerate models. These algorithms demonstrate the versatility of the B-rep technique. The algorithms are not a complete set, because one characteristic of B-rep systems is that they can be adapted to provide a diversity of tools suitable for different users and ap-

plication environments. Instead the algorithms are intended to represent a broad selection of algorithms to illustrate B-rep modelling and the principles of stepwise construction. Chapter 7 outlines some general principles for developing modelling algorithms and demonstrates the use of these principles with two detailed examples.

Chapter 8 describes some techniques for creating and maintaining information and auxiliary structures with B-rep models. These extra facilities are necessary to extend the model so that it can be used for a more complete communication in a distributed application environment.

Chapter 9 discusses some aspects of features which are an extension to the basic representation domain to include sets of model elements with some meaning. There are two basic approaches: feature recognition to recover feature information from a model and "design by/with features" to include feature information directly. These approaches are briefly discussed as well as some other aspects, such as feature verification and feature datastructures.

Chapter 10 describes some basic graphics techniques for presenting models. Chapter 11 describes disc formats and disc transfer of models. Chapter 12 describes command interpreter techniques. Chapter 13 describes some techniques for introducing free-form geometry into the model and chapter 14 describes, sketchily, some application areas. Chapter 15 describes the medial axis transform calculation for volumetric reasoning applications. Finally, chapter 16 describes some miscellaneous aspects of modelling: tolerances and debugging.

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