Chen, Min (ed.); **Kaufman, Arie E. (ed.)**; **Yagel, Roni (ed.)**
Volume graphics. (English) Zbl 0943.68170
London: Springer. xxx, 421 p. (2000).

Volume graphics is a collection of papers on the state-of-the-art of various aspects of modeling and visualization of volumetric data. A volumetric model is specified by a mass of points as opposed to a collection of surfaces. The underlying math is a set of scalar fields defining the geometrical and physical properties of points in 3-D.

The book covers a wide spectrum of important issues in volume graphics. Namely: Overview and modeling in volume graphics. These are survey type papers setting the stage for the rest of the book. Discrete modeling with emphasis on triangular meshes, binary volumes and isovolumes. Volumetric object definitions including such techniques as constructive volume geometry and NURBS volumes. Volume rendering using techniques such as ray casting, marching cubes, and texture mapping. Volume animation with issues ranging from volumetric human models to kinematic control. Hardware support for modeling and rendering with emphasis on fast voxelization. Applications in radiotherapy, facial reconstruction, weather monitoring and 3-D text generation with volumetric data.

The book is nicely illustrated throughout. Each chapter has a large number of references for further study. An extensive glossary closes the book.

Reviewer: Leslie P.Piegl (Tampa)

MSC:

68U05 Computer graphics; computational geometry (digital and algorithmic aspects)
68-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to computer science

Keywords:

volume rendering; constructive volume geometry; NURBS volumes