



Computer Visualization: Graphics Techniques for Engineering and Scientific Analysis

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Rapid advances in 3-D scientific visualization have made a major impact on the display of behavior. The use of 3-D has become a key component of both academic research and commercial product development in the field of engineering design. Computer Visualization presents a unified collection of computer graphics techniques for the scientific visualization of behavior. The book combines a basic overview of the fundamentals of computer graphics with a practitioner-oriented review of the latest 3-D graphics display and visualization techniques. Each chapter is written by well-known experts in the field.

The first section reviews how computer graphics visualization techniques have evolved to work with digital numerical analysis methods. The fundamentals of computer graphics that apply to the visualization of analysis data are also introduced.

The second section presents a detailed discussion of the algorithms and techniques used to visualize behavior in 3-D, as static, interactive, or animated imagery. It discusses the mathematics of engineering data for visualization, as well as providing the current methods used for the display of scalar, vector, and tensor fields. It also examines the more general issues of visualizing a continuum volume field and animating the dimensions of time and motion in a state of behavior.

The final section focuses on production visualization capabilities, including the practical computational aspects of visualization such as user interfaces, database architecture, and interaction with a model. The book concludes with an outline of successful practical applications of visualization, and future trends in scientific visualization.

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