RESEARCH ARTICLE | SEPTEMBER 01 1992

Physics: Cinema Classics FREE

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Comput. Phys. 6, 556–557 (1992)
https://doi.org/10.1063/1.4823109

diffusion, he derives the Poisson and Normal distributions as special cases of the Bernoulli distribution.

Part three opens with a treatment of the kinetic theory of gases. Here, Whitney introduces the powerful concept of detailed balance, and gets at the essence of the fluctuation-dissipation theorem. He proceeds to explore the equilibrium distributions of energies in gases of atoms and photons.

The fourth and final part is essentially an introduction to data analysis. In addition to the standard topics of error in measurement and parameter estimation via least-squares methods, Whitney provides brief but clear discussions of three nonstandard methods: bootstrapping for non-normal or unknown distributions, maximum likelihood for sparse data sets, and simulated annealing for optimization of models with local minima in their cost functions.

The book suffers from its share of relatively minor proofreading oversights (I compiled a list of about a dozen) and at least one surprising and substantive error: in an appendix on the properties of probability distributions, Whitney defines the median of a population as the average of the smallest and largest outcomes in the sample space.

With its emphasis on basic physical processes, and its balanced use of simulation and mathematical analysis, Whitney's book will be of primary interest to anyone looking for a more intuitive and experimental approach to the behavior of physical systems. ■

Physics: Cinema Classics

American Association of Physics Teachers, Instructional Materials Center : National Interactive Media Project, Robert Fuller, Principal Investigator, videodisc, 1992. (Commercial versions, with ancillary teaching aids, will be available in the spring of 1993.)

Reviewed by John W. Robson

Videodiscs offer many advantages in the physics lecture room and teaching laboratory, including those associated with their ability to store large video files in a compact format. Given this ability, a fairly obvious project is conversion of some of the better instructional films to this new medium. Bob Fuller was able to get NSF support to do this, and *Physics: Cinema Classics (P:CC)* is the result.

Earlier this year, the American Association of Physics Teachers, through its instructional Materials Center, offered a precommercial set of the three videodiscs that make up *P:CC.* Over a thousand sets were sold at a price of $425 each — an astonishing indication of interest. This "bare" version is reviewed here; a commercial version with ancillary material will become available in the spring of 1993.

Physics: Cinema Classics is a collection of nearly 300 short segments from about 100 sources. Archiving of complete classic films still needs to be done. The segments are strung together in a logical order with, in many cases, two separately added sound tracks. An "Inquiry track" poses questions and problems, while an "Explanation track" discusses the physics. In appropriate places — for example, where Professors Hume and Ivey discuss their relative orientation — the original soundtrack is included. Instructions for advancing through segments are printed in the lower corners of key frames, and tables of contents appear in various places. This concept,

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referred to as interactive video, provides a lot of guidance to the viewer.

Maneuvering among the 54,000 frames on each of the six sides can be accomplished in three ways. The most straightforward is to use a handheld controller. The most powerful is to use a microcomputer. The least expensive (and most limited) is to use a bar-code reader.[1] The precommercial set has a printed table of contents with frame numbers for the 239 chapters. Printed bar codes to access the same chapters and to give limited control over a videodisc player are also included. I hope that the commercial version will provide additional tools for access. For example, HyperCard or Toolbook stacks would be useful.

Films ordinarily run at 24 frames per second (fps), whereas the nearest standard video speed is 30 fps.[2] Therefore, in order to compensate for this discrepancy, which is particularly important when the original sound track is used, some of the sequences repeat every fourth frame. Unfortunately, the attempt to indicate when this has or has not been done is confusing. This could be a problem if data were being taken from the videodisc. The periodic error from repeating frames would not be larger than 1/24 s and would rarely present a problem; not knowing which clock rate to use would be much more serious. Perhaps the commercial version will clarify this.

Several sequences from another videodisc recently prepared by Apple Computer, and several others from the Newton's Apple TV program, are included. Thus are classics made. All in all, *P:CC* will be a worthwhile addition to a teacher's tools of the trade. ■

References

1. Nearly all of the many models of videodisc player come with some sort of handheld controller. Many accept commands through a serial port from a microcomputer. A few accept a limited set of commands from a bar-code reader.
2. Many videodisc players can run at 7.5, 15, 30, 60, and 120 fps, but not at 24 fps.