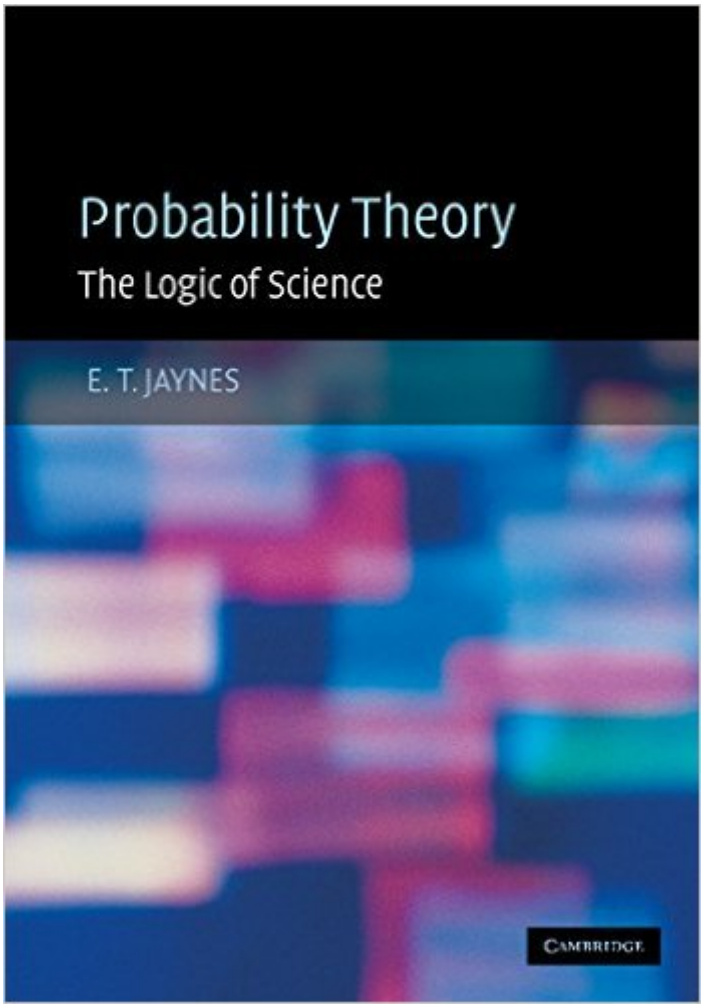
Probability Theory: The Logic Of Science



Synopsis

Going beyond the conventional mathematics of probability theory, this study views the subject in a wider context. It discusses new results, along with applications of probability theory to a variety of problems. The book contains many exercises and is suitable for use as a textbook on graduate-level courses involving data analysis. Aimed at readers already familiar with applied mathematics at an advanced undergraduate level or higher, it is of interest to scientists concerned with inference from incomplete information.

Book Information

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Customer Reviews

This book has been on the web in unfinished form for a number of years and has shaped my scientific thinking more than any other book. I believe it constitutes one of the most important scientific texts of the last hundred years. It convincingly shows that "statistics", "statistical inference", "Bayesian inference", "probability theory", "maximum entropy methods" , and "statistical mechanics" are all parts of a large coherent theory that is the unique consistent extension of logic to propositions that have degrees of plausibility attached to them. This is already a theoretical accomplishment of epic proportions. But in addition, the book shows how one actually solves real world problems within this frame work, and in doing so shows what a vastly wider array of problems is addressable within this frame work than in any of the forementioned particular fields.If you work in any field where on needs to "reason with incomplete information" this book is invaluable.As others have already mentioned, Jaynes never finished this book. The editor decided to "fill in" the missing parts by putting excercises that, when finished by the reader, provide what (so the editor guesses)

Jaynes left out. I find this solution a bit disappointing. The excercises don't take away the impression that holes are left in the text. It would have been better if the editor had written the missing parts and then printed those in different font so as to indicate that these parts were not written by Jaynes. Better still would have been if the editor had invited researchers that are intimately familiar with Jaynes' work and the topic of each of the missing pieces to submit text for the missing pieces.

From a few common sense requirements, the books starts by deriving basic results such as the product and sum rules, for probabilities defined not in terms of frequencies, but as degrees of plausibility. This was an eye-opener for me, having imbibed the common attitude that such probabilities are 'subjective' and, implicitly, lacking rigor and utility.Jaynes' knowledge of the history and philosophy of statistics is far deeper than that of most statisticians (including myself). His trenchant style gives the book a narrative drive and cover-to-cover readability that, in my experience, is unique in the field. One such strand is the continual battle between his respect for RA Fisher's abilities, and his exasperation at how wrongheadedly he feels they were channelled. And he doesn't hesitate to take on philosophical heavyweights such as Hume in defending the possibility - - in fact, the necessity - - of inductive inference. However, this style also produces some more bitter fruit, such as the way the author repeatedly likens himself to historical victims of religious persecution.The book weakens when it turns to applications. Regression with errors in both variables is said to be 'the most common problem of inference faced by experimental scientists' who have 'searched the statistical literature in vain for help on this'. Good points. So why don't the author and editor give us at least a reference for just one of the 'correct solutions' which 'adapt effortlessly' to scientists' needs? And Jaynes' argument that the null hypothesis procedure 'saws off its own limb' would also rule out mathematical proof by reductio ad absurdum.When estimating periodicities, we're told that 'the eyeball is a more reliable indicator of an effect than an orthodox equal-tails test'.

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