Deriving Laws from Ordering Relations (Paperback)

By Kevin H Knuth

Bibliogov, United States, 2013. Paperback. Condition: New. Language: English . Brand New Book ***** Print on Demand *****.The effect of Richard T. Cox s contribution to probability theory was to generalize Boolean implication among logical statements to degrees of implication, which are manipulated using rules derived from consistency with Boolean algebra. These rules are known as the sum rule, the product rule and Bayes Theorem, and the measure resulting from this generalization is probability. In this paper, I will describe how Cox s technique can be further generalized to include other algebras and hence other problems in science and mathematics. The result is a methodology that can be used to generalize an algebra to a calculus by relying on consistency with order theory to derive the laws of the calculus. My goals are to clear up the mysteries as to why the same basic structure found in probability theory appears in other contexts, to better understand the foundations of probability theory, and to extend these ideas to other areas by developing new mathematics and new physics. The relevance of this methodology will be demonstrated using examples from probability theory, number theory, geometry, information theory, and quantum mechanics.

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