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A Decision Theoretic Approach for Hypothesis Testing in Particle Physics

The statistical procedure used in a family of problems in particle physics, similar in nature to the discovery of Higgs Boson, is investigated in this presentation. The problem is considered from a decision theoretic point of view. We introduce a loss function that mimics the features of the current procedure and obtain the Bayes rule. Comparisons are made between the existing and proposed methods in terms of frequentist properties of statistical testing procedures. The comparison results are interpreted as the approximate equivalence of the currently used method with the Bayes rule with certain choice of loss values and/or priors.