TEST OF HYPOTHESES AND OPERATING CHARACTERISTIC CURVES VERSUS CONFIDENCE SETS

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ABSTRACT

This paper presents a critique of an article
by Natrella. Confidence sets, Operating Cha-
racteristic Curves and a class of Tests of
Hypothesis are characterized. Using A Progra-
mming Language (APL) various quantities and
relationship are explained with an example.

INTRODUCTION

Confidence sets, operating characteristic curves and a class
of test of hypothesis will be characterized and defined. Certain
ill defined statements of Natrella [1] are considered. Examples of
a class of problems and their traditional solutions are given. If
the statements were better defined (in fan anticipated way) then
the class of examples would be a class of counterexamples to the
statements. There are comments to the effect that the class of
counterexamples is a sufficiently important part of (frequentist)
statistics that we would not like to resolve the contradictions by
deleting these solutions from statistics.

CHARACTERIZATIONS AND DEFINITIONS:

Let $A(\theta)$ be the region of acceptance of the hypothesis

$$H_0 : \phi = \theta$$

for some error rate α and any permissible θ. In the test of
hypothesis,

$$H_0 : \phi = \theta_0$$

he fails to reject H_0 if the observed value X has the property
$\in A(\theta_0)$. The probability of this event (assuming continuity or a
randomized test) is $1-\alpha$.

The operating characteristic curve is taken to be synonymous
with the power curve in this writing. The curve is $P\{X \in A(\theta_0) | Ph\theta\}$
graphed against θ. The only A needed is $A(\theta_0)$, and the outcome X