NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.
The problem of estimating a set of pre-assigned parameters by a
randomly chosen fractional replicate of a full factorial system, previously
studied by Ehrenfeld and Zacks [4], was studied further in terms of
decision theory. In this context the experimenter chooses a strategy which
consists of a randomization procedure combined with an estimator. The
class of randomization procedures considered include, as special cases,
the classical fixed fractional factorial experiments as well as those
studied in [4]. This forms a fruitful framework for studying the relative
merits of randomization. A preference relation between procedures is
defined in terms of minimax risk for two loss functions: mean-square-error
and closeness. Minimax strategies, for various states of information
concerning nuisance parameters are derived. It is shown, for example,
that when all the signs of the nuisance parameters are known, randomization
procedure I, studied in [4], is optimal. When all the signs are known,
there exists a fixed fractional factorial experiment, combined with a
suitable adjusted estimator, which is optimal. These and other related
results are given in papers [1], [2], and [3], previously sent to you on
October 18, 1962 and March 4, 1963. These papers have been submitted for
publication.

Other work in this area which is being pursued involves the comparison
of different experiments for estimating parameters in birth and death

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stochastic processes with particular application to queueing problems. The various experiments being compared involve the length of observation time and the kinds of observations which should be taken.

The principal investigator on this grant is Dr. Sylvain Ehrenfeld. Others who have worked on this research grant are Irwin Greenberg and Shelemayahu Zacks.

References:

[1] "Comparison of Randomized and Non-Randomized Factorial Experiments"
[2] "Minimax Closeness Strategies and the Comparison of Randomized and Non-Randomized Factorial Experiments"
[3] "On Fractional Factorial Experiments"