

USES OF STOCHASTIC MODELS IN THE EVALUATION OF POPULATION POLICIES.

II. EXTENSION OF THE RESULTS BY COMPUTER SIMULATION

EDWARD B. PERRIN
UNIVERSITY OF WASHINGTON

1. Introduction

The results obtained by the application of the conventional techniques of the theory of renewal processes and the theory of semi-Markov, or Markov renewal, processes to the general fertility model, as described in [1] and [2], for example, are interesting and quite possibly of some practical value. There remain, however, a number of important respects in which the problem does not yield to the application of these techniques, at least in our present state of knowledge. For example, most of the results that exist thus far for the most general model of human reproduction are asymptotic results (see references in [2]) with respect to time and hence are relations which are at best only approximately true during any short period of observation of the system. It would be of interest to know how well the distribution of the numbers of renewals of a given event, such as a live birth, that occur in a given time period for an individual woman is approximated by the respective asymptotic distribution, given a particular set of parameters. What does the exact family size distribution really look like after short periods of marriage under a given model, and how long must the process be observed before this distribution is reasonably well approximated by the asymptotic results obtained from the results of renewal theory?

As a second area of consideration, there is the very important problem of the generalization of the set of stochastic models by the relaxation of some of the more restrictive assumptions in order to allow the mathematical system to conform more closely to the biological system which it is attempting to describe. For example, it is clearly important to investigate the behavior of the particular model of the reproductive process described in [2] when the fecundability of the individual female is allowed to be a function of factors such as age, parity, and so forth. There are a number of directions in which this and other models could

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