ABSTRACTS

COMMENTS ON THE TREATMENT OF "IMPROVING THE FIT" IN <u>ELEMENTS OF GRADUATION</u>

Walter B. Lowrie

The paper gives two criteria for fit and uses two different criteria to transform an initial graduation into one with better fit. It is shown that the two sets of criteria give the same transformation. The mathematical relationships between the two sets of criteria are then derived. It is clear from those relationships that when one set of criteria is small, the other set is small (but reasonably the same). Some general comments on various measures of fit are made.

DEFINING THE YIELD RATE

Warren R. Luckner

This article provides a discussion of the definition of yield rate as presented in text on the theory of interest, and discussed a problem that definition raises with respect to certain solutions.

IMMUNIZATION UNDER STOCHASTIC MODELS OF THE TERM STRUCTURE

P. P. Boyle

The purpose of the paper is to survey some new results concerning the term structure of interest rates and discuss actuarial applications.

Although the details differ, the central idea is to assume that the spot rate r(t) follows a Gaussian Markov process. The arbitrage principle together with some assumption about investors tastes is invoked to obtain the price of a pure discount bond (i.e., a zero coupon bond) of arbitrary maturity. The process followed by the spot rate determines the behavior of the yield curve. The present paper examines the concept of immunization within the framework of these models.

THE INVESTMENT PROCESS AND PRESENT VALUE CALCULATIONS
James A. Tilley

It has become fashionable for research-minded actuaries to cast classical life contingency problems in a stochastic framework. Panjer and Bellhouse, for example, showed how to compute moments of insurances and annuities when interest rates as well as mortality (or other causes of decrement) are governed by a stochastic process. I wondered whether their technique could be used when a realistic investment process was assumed, but I have had little success in trying to do this. This paper presents some thoughts on the subject, and invites others with different perspectives to bring them to fruition.

THE UNIFORM DISTRIBUTION OF DEATHS ASSUMPTION
AND PROBABILITY THEORY

Hans U. Gerber and Donald A. Jones

By formulating net single premiums as expected values of random variables, an elegant and simple method is developed to derive formulas

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under the uniform distribution of deaths assumption. This method obviates the use of summations, and its simplicity argues for consistent use of the uniform distribution of deaths assumption.

EXPOSED-TO-RISK CONSIDERATIONS BASED ON THE BALDUCCI ASSUMPTION AND OTHER ASSUMPTIONS IN THE ANALYSIS OF MORTALITY

Jan M. Hoem

In the actuarial literature on the measurement of mortality, a theory involving exposed-to-risk concepts has grown up around the assumption of a uniform distribution of deaths, the Balducci assumption, and the assumption of a constant force of mortality. This paper points out that some corresponding relations given in two Society of Actuaries textbooks are based on arguments which are less than completely accurate, and it provides procedures based on correct reasoning on the basis of straightforward, non-subtle statistical theory. The main message of the paper is that actuaries should stop devising mortality measurement procedures based on special arguments and should instead turn to standard statistical theory for their methods. In particular, there seems to be no reason to prefer methods based on the Balducci assumption or on the assumption of a uniform distribution on deaths to methods based on the assumption of a constant force of mortality.

ON THE NUMERICAL EVALUATION OF SURVIVAL PROBABILITIES

W. Santermans and M. J. Goovaerts

This paper presents some comments on the numerical evaluation of survival probabilities based on algorithms developed by Hilary Seal.

CONSUMER LOANS AND THE HARMONIC MEAN

Michael E. Mays

The interest rate on a consumer loan can be estimated from information about terms of the loan via the Merchant's Rule, the minimum yield method, the constant ratio method, or the Rule of 78. In this paper we express interest rates gotten from the Rule of 78 and the constant ratio method in terms of those associated with the minimum yield method and the Merchant's Rule.

AN APPROXIMATE SOLUTION FOR THE UNKNOWN RATE OF INTEREST FOR AN ANNUITY CERTAIN

Murray Silver

This paper derives approximate solutions for the implicit interest rate given the value of an annuity certain.

SHOULD THE DEFINITION OF COMPOUND INTEREST BE MODIFIED - ACTUARIAL NOTE

Pierre Chouinard

This paper proposes an alternate definition for compound interest from which it follows that $(1+i)^t$ is good for any real value of t.

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