

## Stochastic Investment Modelling: A Tutorial

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### Abstract

Discrete time series models are useful in analyzing actuarial assumptions (such as nonissue rates, lapse rates, investment rates, incidence rates, and severity rates) for pricing and reserving insurance products. Financial time series modelling is also important to actuaries for generating economic scenarios in a dynamic financial analysis (DFA) model or in a cash flow testing (CFT) model. In addition to analysing time-dependent variables that are specific to the pricing, reserving or dynamical analyzing of insurance products, advanced time series models have been used for the estimation of value-at-risk (VaR) and other relevant measures of market risk.

In recent years, statistical research in nonlinear time series analysis has grown rapidly. In this tutorial, we explore the use of nonlinear time series models to analyze economic/actuarial time series data. We shall also demonstrate the financial and actuarial applications of these models via real examples.

**Keywords:** Graduate Students in Actuarial Science; Statistics; Finance; Risk Management.