# A comparative analysis of Interest Rate Models for Actuarial Use

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# Abstract

Managing interest rate risk over the long term is a very important aspect of any financial institution, more so for actuarial firms who have products that do stretch over long periods of time. Risk managers will be concerned about the effect of future interest rates on their assets and liabilities. We will design a Java application, in which the work said forth from here on is implemented, that can be used to evaluate bond prices and can also be used as a stochastic interest rate generator or indeed an economic scenario generator to simulate interest rates over a long period of time. The application will compute zero coupon bond prices analytically, and numerically using Monte-Carlo methods, and produce stochastic interest rates.

After careful study of the note, users should be able to make use and understand better some of the collected works in this subject area. Then, after studying some of the technical references, many actuaries, risk managers, and users alike should be able to begin to build their own practical and suitable models. Many models have been proposed and developed to model the behaviour of future interest rate levels. In this note, focus will be on short rate models that are popular in the use of valuing financial products and managing interest rate risk, namely, the Vasicek model (1977), and the Cox-Ingersoll-Ross (CIR) (1985) models. The models will be compared on how well they simulate consistent interest rates over a long period of time, and compute bond prices.