Obligs STK3505

Introduction.
There are two obligs, and you are to answer them in a form that could be understood by management or even the board of a company which means that quantities and assumptions must be clearly and simply defined. The presentations should be handed in on paper no later than **November 5, 2014**, either during the lectures on Tuesdays or in the box of the ordinary, postal mail to Erik Bølviken on the seventh floor of the Math building. Both obligs must be answered for you to be allowed to take exam, and they must be written individually.

Oblig 1.
Suppose a property insurance company has responsibility for Poisson/Gamma-portfolio where the mean number of claims is 20 each year and the mean size of each claim is 1 money unit. The amount of historical information to go one has been limited, and the variation per claim is therefore considered uncertain with a standard deviation that must be varied. Use in your report the three different values 0.5, 1.0 and 2 and calibrate the parameters of Gamma claim distribution accordingly.

The company is thinking of reinsuring the portfolio through an $a \times b$ contract per event where b is infinite. Vary a between 1, 2, 4 and 10, and show how much smaller the net reserve becomes by reinsuring. The computations are repeated for each of the three values of the standard deviation. Balance this against a second table displaying the average loss caused by the reinsurance when the market demands a loading of 50% and try to comment on how the tables could be used by management to tune the amount of reinsurance.

Oblig 2.
Consider the cliquet option between limits r_g and r_c as introduced in Section 3.5 of the textbook[1] when the underlying return R is log-normal with volatility $\sigma\sqrt{T}$. Explain briefly how the value of such options are found. Then assume that the guarantee $r_g = 0.03$ and that the risk-free return in the money market is $rT = 0.03$. Tabulate the price for the cliquet option when $\sigma\sqrt{T}$ varies between 0.2, 0.25 and 0.3 and $r_c = 0.06$, 0.10, 0.15, 0.30 and 0.40 and discuss how sensitively it depends on r_c. Is the cliquet option a viable strategy?

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[1]Bølviken, E. (2014). Computation and Modelling in Insurance and Finance. Cambridge University Press.