



RISK MANAGEMENT OF A FUND FOR NATURAL DISASTERS

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Mexico is a country which has to deal with several natural disaster risks: earthquakes, droughts, volcanic eruptions, floods, slides, wild fires, extreme temperatures, etc. In order to reduce the country’s vulnerability to the impact of these natural disasters and to support rapid recovery when they occur, the government established in 1996 Mexico’s Fund for Natural Disasters (FONDEN). Since its creation, its resources have been insufficient to meet all government obligations.

The aim of this project is the development of a dynamic strategy to optimise the management of a fund for natural disasters starting from the example of FONDEN. The problem of budgetary planning is being considered for the modelling.

We control the level of the fund’s cash $(R_t)_{0 \leq t < T}$, where $T < \infty$. The optimality is meant in the sense of minimizing some risk measure including $E[(c - R_T)_+^2]$, where c is the objective value for R_T , by controlling the amount taken from FONDEN’s trusteeship together with the money borrowed at time t . For the initial model, we assume that the deterministic payments for risk transfer and debt are made at $t = 0$. We determine $c > 0$ at $t = 0$ and then we try to pull at every moment the process to this objective.

Multifractal models in geophysics are physically based stochastic models. A multiplicative cascade model fitted to a data set can be used for generation of synthetic sequences that resemble the original data in terms of its scaling properties. Since recent years, uncertainty concepts based on multifractal fields are being applied to the development of techniques to calculate marginal and conditional probabilities of an extreme rainfall event in a determined zone. As initial point to the development of the model, a multifractal model for extreme rainfall events will be used as part of the input

for the stochastic control model. A theme for further research is linking more warning systems to the model.

Keywords: risk management, stochastic control, multifractal measures, multiplicative cascades, heavy rainfall events.