

**Proposition of internship
in the TOSCA project-team (INRIA Nancy-Grand Est)**

WEATHER DERIVATIVES

Keywords : Mathematical finance, Monte Carlo methods, exotic options.

The risk management appeared long time ago and does not cease to take importance in the current context. At the beginning the idea was to insure oneself against the exchange rate risk, the credit risk or the price of the raw materials. There exists today financial derivatives allowing to hedge against the climatic risks and their consequences.

A weather derivative is a financial product making possible to hedge against the risks related to the fluctuations in the weather. In this case the underlying asset can be the temperature, the quantity of rain, the strength of the wind or the quantity of fallen snow. Contrary to the case of the traditional derivative products, the underlying asset corresponds to the climatic risks and is not quantifiable as a price on the market.

The goal of this internship is to carry out the study of the weather derivatives, from the mathematical point of view in order to model the underlying asset and its implication in the constitution of the financial product and also the numerical approximation methods of Monte Carlo type.

Prerequisites : Knowledges in Stochastic Differential Equations and Monte Carlo methods, and in programming (C++, ...).

Location and duration : The internship will take place at the Institut Élie Cartan in Nancy, France, under the supervision of Madalina Deaconu¹, Samuel Herrmann² and Antoine Lejay³. Its duration can be 4 or 5 months.

October 2009

¹Madalina.Deaconu@inria.fr

²Samuel.Herrmann@iecn.u-nancy.fr

³Antoine.Lejay@iecn.u-nancy.fr