

A Nonstandard Finite Difference Method for Weather Derivatives Pricing Model

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Abstract : The price of an option weather derivatives can be approximated as a solution of the two-dimensional convection-diffusion dominant partial differential equation derived from the Ornstein-Uhlenbeck process, where one variable represents the weather dynamics and the other variable represent the underlying weather index. With appropriate financial boundary conditions, the solution of the pricing equation is approximated using a nonstandard finite difference method. It is shown that the proposed numerical scheme preserves positivity as well as stability and consistency. In order to illustrate the accuracy of the method, the numerical results are compared with other methods. The model is tested for real weather data.

Keywords : nonstandard finite differences, Ornstein-Uhlenbeck process, partial differential equations approach, weather derivatives

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