Mathematical Models of Risk Management and their CNN Realization

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This talk deals with several properties of the Black-Scholes equation and its nonlinear modifications which are relevant in Finance. In particular, some analytical solution methods are investigated. Dirichlet problem for some second order PDEs with non-negative characteristic form will be presented as well. The classical solution method is presented in a general framework. The results are applied to the pricing problems for a financial option of barrier type.

It is known that some autonomous Cellular Neural Networks (CNN) represent an excellent approximation to nonlinear partial differential equations (PDEs). In this talk we will present the Black-Scholes PDE by its CNN model. The intrinsic space distributed topology makes the CNN able to produce real-time solutions of nonlinear PDEs. Numerical simulations of our CNN model are obtained. Making comparison with the classical results we conclude that the option risk- management is therefore beyond the scope of the linear models.