Pricing and Hedging Exotic Options

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Financial markets are becoming more and more complex with trading not only of stocks, but also of numerous types of financial derivatives. Options and Derivative securities account for more than half the modern market and the basic tools for risk hedging in any portfolio management. The development of mathematical models to understand the relationship among complicated financial instruments has enabled the proliferation of these instruments which enhance the efficiency of worldwide capital markets. With the rapid increase in sophisticated quantitative models employed in financial firms, It then follows that development of new mathematical and computational techniques for the accurate evaluation of complex financial models have considerable financial worth in addition to constituting cutting- edge research.

Valuation of Exotic options, such as options with multiple strike prices, complex digital options and barrier options is particularly challenging for traditional computational techniques which can perform inaccurately due to the discontinuities in the in the payoff functions or it’s derivatives. Large errors may also occur in estimating the hedging parameters such as delta and gamma values, even though the prices appear to be correct. The non-smooth date can further lead to serious degradation in the convergence of the numerical schemes. In this talk we will present current sate of research in pricing and hedging these challenging problems.