ADI schemes for multidimensional PDEs in finance

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Abstract

This talk concerns the numerical solution of time-dependent, multidimensional PDEs arising in financial option valuation theory. For the efficient and stable numerical solution of the large-scale systems of ODEs that are obtained after space discretization, we discuss splitting schemes of the Alternating Direction Implicit (ADI) type. Stability results are presented for the important case where mixed spatial derivatives are present in the PDE. Practical applications concern the well-known Heston and Heston-Hull-White PDEs. Special attention will be directed towards the effective approximation of the hedging quantities, such as Delta and Gamma.