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Optimal Hedging of a Portfolio of European Options in an Extended Binomial Model under Proportional Transaction Costs

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Abstract : Hedging of a portfolio of European options under proportional transaction costs is considered. Our discrete time financial market model extends the binomial market model with transaction costs to the case where the underlying stock price ratios are distributed over a bounded interval rather than over a two-point set. An optimal hedging strategy is chosen from a set of admissible non-self-financing hedging strategies. Our approach to optimal hedging of a portfolio of options is based on theoretical foundation that includes determination of a no-arbitrage option price interval as well as on properties of the non-self-financing strategies and their residuals. A computational algorithm for optimizing an investor relevant criterion over the set of admissible non-self-financing hedging strategies is developed. Applicability of our approach is demonstrated using both simulated data and real market data.

Keywords : extended binomial model, non-self-financing hedging, optimization, proportional transaction costs
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