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Pricing, hedging and optimal exercise of game options

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The dissertation is about studying the problem of pricing and hedging Game Contingent Claims, together with the optimal termination times for both the seller and the buyer. Game Contingent Claims (GCC) were introduced by Yuri Kifer in 2000. It is a financial contract that enables both the writer and the buyer of the option to terminate the contract at any time up to maturity date. If the contract is terminated by the writer, then he must pay a certain penalty to the buyer. It is in a certain sense an extension of American option, with the additional provision that both the writer and the buyer of the option are entitled to terminate the contract at any time prior to expiry, triggering a payoff payment. The standard Cox-Ross-Rubinstein model (CRR-model) has been used to price Game options in this study. The theorem about the pricing model has been shown and proved, results show that the unique fair price of the Game option is the solution of a minmax problem involving stopping time. It has been shown through a numerical that if the penalty is too high, then the writer (or seller) can not cancel implying we arrive at an American Contingent Claim (ACC). For incomplete markets, utility maximization approach was used in the study. The objective is to determine the portfolios consisting of the risky and risk-free assets that maximize utility of terminal wealth for the seller and the buyer. Results show that when the seller and the buyer have exponential utility functions, there exists a Nash equilibrium point. The price of the option is then the value of either the buyer's or seller's portfolio evaluated at the obtained Nash equilibrium of the game theory problem. The portfolios that gives maximum utility for the seller and buyer have also been calculated as well as the maximum outputs.