# CCSU

## DEPARTMENT OF MATHEMATICAL SCIENCES

# COLLOQUIUM

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10:00 – 11:00 PM

Maria Sanford Hall, Room 103

# MINING FOR PROFITABLE LOW-RISK DELTA-NEUTRAL LONG STRADDLE OPTION STRATEGIES


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(Data Mining MS Thesis Presentation)

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**Abstract**: This study provides a framework for identifying potential low-risk high-profit option strategies. Delta-neutral long straddle strategies are explored. These strategies are profitable when the underlying stock price either increases or decreases considerably. Option transactions between years 2002 and 2006 for seven underlying stocks with high transaction volume were used to form the strategies. Some of the drivers of the values of an option such as implied volatilities, Greeks, and their elasticities were computed using the Black-Scholes option pricing model. The strategy risk (in %) is defined here as the fraction of tradable days with a loss. Strategies were classified as low-risk if their corresponding strategy risk was less than or equal to 50%. Only about 6.9% of the identified delta-neutral long straddle strategies were low-risk strategies.

The entry analysis identifies the low-risk delta-neutral long straddle strategies that could be entered. Predictive models were built and validated using SAS JMP software. A set of neural network models, one for each underlying stock, that predicts the low-risk category using all standardized variables as independent variables had the highest test accuracy of about 58% true positives. This model was selected as the best predictive model. Top 2% of the predicted low-risk strategies from the best predictive model, with an overall lift of around 8, were identified as the best low-risk strategies to enter.

The exit analysis identifies optimal conditions to exit the entered strategies so as to maximize the expected profit under various constraints. An entered strategy is exited when one of the following optimal conditions is met: the loss limit, the profit limit, limit on remaining days to expire or the last tradable day. A grid search on the training data is performed to find the optimal exit rules, which are further validated using test dataset. The grid with various exit parameter limits and strategy returns are computed by a heuristic algorithm that minimizes data processing time. For a trader with limited funds, the optimal exit rules that corresponds to the constraint that 75% of entered strategies are expected to exit profitably was chosen as the best scenario to maximize strategy returns. Under such trading scenario, mean profits from 5.1% (QCOM) to 44.4% (MO) were observed.



***For further information:***

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