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# MF-796: COMPUTATIONAL METHODS IN MATH FINANCE

## Project Proposal

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### GROUP MEMBERS

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# **ACCELERATED EXTRACTION AND APPLICATION OF RISK-NEUTRAL DENSITY FROM MARKET PRICES FOR OPTION TRADING**

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## **Phases:**

**Data:** Bloomberg Option trading Data

### **Adapted Approach:**

- Focus on high-impact tasks and utilize agile methodologies to ensure rapid progress.
- Leverage the diverse skills of the team members for multitasking, with parallel processing of data collection, analysis, and strategy development.

### **Resource Allocation:**

- Assign specific roles to each team member, such as data collection, statistical analysis, strategy development, and testing.
- Utilize automated tools and software to speed up data processing and analysis.

### **Expected Outcomes:**

- A viable trading strategy based on the extraction of risk-neutral densities, tailored for a short-term project scope.
- Preliminary insights into the effectiveness of the strategy in exploiting fat-tail events.

### **Risks and Mitigation:**

- Time Constraint: With only two months, there is limited time for extensive back testing and refinement. Mitigate by focusing on the most promising strategies and using efficient back testing methods.
- Limited Data Analysis Depth: Due to time constraints, the analysis might not cover all complexities of the market. Focus on key indicators and robust, yet time-efficient analytical methods.

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## **Timeline:**

### **❖ *Weeks 1-2: Rapid Data Collection and Initial Analysis***

- Collect market data on options, prioritizing readily available and relevant datasets.
- Begin preliminary extraction of risk-neutral density using efficient algorithms.

### **❖ *Weeks 3-4: Intensive RND Extraction and Fat Tail Identification***

- Complete the extraction of risk-neutral densities.
- Identify fat-tail distributions in both call and put options using accelerated analytical methods.

### **❖ *Weeks 5-6: Strategy Development and Mini Back testing***

- Develop a trading strategy focusing on selling identified fat-tail options.
- Conduct a concise back testing procedure using historical data to test the strategy's validity.

### **❖ *Weeks 7-8: Strategy Implementation and Short-Term Evaluation***

- Implement the trading strategy in a simulated or real market environment.
- Perform a short-term evaluation of the strategy's performance, making adjustments as necessary.