## **Task 1: Order Flow Imbalances (OFI)**

### **Objective**

Evaluate the candidate’s understanding of price impact models, Order Flow Imbalance (OFI) construction, and the ability to extend OFI concepts across different order book granularities and cross-asset relationships. This skill is foundational to our research efforts.

### **Resources Provided**

* Dataset: first\_25000\_rows.csv
* Research Paper: *"Cross-Impact of Order Flow Imbalance in Equity Markets"* (PDF)

### **Task Instructions**

You must construct the following OFI features (your output should produce **one value per chosen timestamp**):

* **Best-Level OFI**
* **Multi-Level OFI**
* **Integrated OFI**
* **Cross-Asset OFI**

In addition, answer the following conceptual questions:

1. What’s the motivation behind measuring OFI at multiple depth levels of the order book?
2. Why do the authors use Lasso regression rather than OLS for estimating cross-impact?
3. Why is OFI considered a better predictor of short-term returns than trade volume?

### **Submission Requirements**

* **Code:** Upload your OFI feature construction code (clean and modular) to a **GitHub repository** and share the link.
* **Written Answers:** Submit a **LaTeX-generated PDF** that answers the conceptual questions clearly and professionally.

## **Task 2: Smart Order Routing (SOR) – Reading Preparation**

### **Objective**

Prepare the candidate to critically understand a foundational paper on smart order routing optimization ahead of the interview. This material will form the basis of technical discussion during the hiring process.

### **Resources Provided**

* Research Paper: *"Optimal Order Placement in Limit Order Markets"* by Cont and Kukanov (PDF)

### **Task Instructions**

* Carefully read and study the paper. Focus on understanding:  
  + The formulation of the optimization problem.
  + How market orders and limit orders are allocated.
  + The role of sampling and stochastic optimization methods.
  + How market microstructure inputs (e.g., queue size, order flow) influence routing decisions.
* You will not be required to submit a written assignment for this task.
* However, **you will be asked technical questions based on this paper during the interview**, so please ensure you critically understand the material.

# **Final Submission Checklist**

| **Deliverable** | **Format** |
| --- | --- |
| Task 1 Code (OFI feature construction) | GitHub repository link |
| Task 1 Conceptual Answers | LaTeX PDF |

# **Submission Deadline**

All submissions are expected to be completed and sent within **48 hours** after the task is assigned (consider this is the most up to date deadline).   
 Please prioritize clean, readable code and clear, well-structured LaTeX writeups.

Would you like me to also create a **small message** you could paste when you send this task to candidates? (Polite and clear tone.) It’ll make your outreach much smoother.  
 Let me know!