



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON STATISTICS

Financial Time Series: Structure, Bayesian Approach and Risk Control

By

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Abstract

The Dow Theory, one of the oldest theories about financial time series (FTS), suggests that FTS exhibit trends. Long and medium-term trends indicate market directions, while short-term trends are merely fluctuations. The modern challenge lies in using statistics and machine learning techniques to classify these short, medium, and long-term trends for application in quantitative trading. Another early strategy is Kelly's criterion, also known as "fortune's formula." Edward Thorp, who famously applied this formula in blackjack gambling, later abandoned it when he moved to the stock market.

Inspired by these stories, we study FTS from its structure. To spot trends, we need to identify peaks and troughs within the data. There are many ways to do this, often based on local maxima and minima over certain periods. In this talk, we present a rigorous, amplitude-based definition of peaks and troughs. We then introduce the concept of up and down states for each point in the series, depending on whether the series will cross a certain threshold upward or downward first. From these, we define singular points—the first points where the state is unknown within a finite series. Using the concepts of peaks, troughs, and singular points, we can mathematically define uptrends and downtrends. This classification not only helps us understand the series better but also allows us to extend Kelly's approach beyond two-result gambling into financial markets with continuous prices.

Date : 05 November 2025 (Wednesday)

Time : 3:00p.m. - 4:00p.m.

Venue : Room 2304 (near Lift 17 & 18)

All are welcome!