University of Macau

Faculty of Science and Technology

Department of Mathematics

Wave-shape analysis via nonlinear time-frequency analysis and some medical applications

By

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Time: **10:00 a.m. - 11:00 a.m.**

Venue: **E11- G015**

Abstract

An innovative and adaptive acquisition of correct features, which is frequently nonlinear in nature, from massive datasets with solid mathematical support is the core of modern data analysis. Most of time, we have two main interests regarding an oscillatory time series; one is how fast/large the oscillation is, and the other one is how the signal oscillates. We could quantify these features by ``instantaneous frequency'', ``amplitude modulation'' and "wave-shape function". In this talk, I will discuss how to apply newly developed nonlinear time frequency analysis techniques to study this kind of signal. The theoretical properties will be provided to justify the algorithm. The developed methods are directly applied to analyze medical signals, like ECG and pulse wave, and study clinical problems like ventilator weaning prediction problem in the critical care medicine.

Biography

Hau-tieng Wu is an assistant professor in Mathematics department at University of Toronto. He earned his PhD in Princeton University and post-doc experience in Stanford University，University of California, Berkeley，Princeton University. Now he focus on analyzing big/massive datasets by applying proper mathematical tools/theorems and their medical applications. His research interests include differential geometry and algebraic topology, harmonic analysis, random process, the probabilistic and statistical analysis. In the medical data analysis field he focuses on anesthesia/sedation/sleep analysis, breathing/heart rate variation analysis and ECG waveform analysis, etc. He has achieved many significant results in more than 40 papers on international academic journals.