

Speaker: Leon Cohen, City University of New York

Title: Time-varying spectra and Quasi-distributions for systems governed by differential equations

Abstract: Time-varying spectra is one of the most primitive sensations we experience since we are surrounded by light of changing color, by sounds of varying pitch, and by many other phenomena whose periodicities change. Hence, the need to develop the physical and mathematical ideas required to understand what a time-varying spectrum is. We will describe why this is an elegant and challenging problem and how quasi-distributions for non-commuting variables introduced about seventy years ago in quantum mechanics have been used to study such classical situations. In addition, we will show the immense practical applications over the last few years to areas such as biomedical signals, geophysical signals, fault detection, sonar, etc. Also, we will describe methods that allows one to transform deterministic and random differential equations into phase space, resulting in a new perspective and an immense simplification of their solution.