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THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

SEMINAR ON INDUSTRIAL PROBLEMS

SPEAKER:

DR. SIMON HAYKIN
Director, Communications Research
Lab/Electrical Engineering
McMaster University

On the Topic:

"Chaotic Signal Processing"

In this talk we focus on the study of chaos in the context of an ocean environment that is monitored by a radar system. Throughout the talk, the emphasis will be on the use of experimental data to support the validity of some new and important discoveries that we have made during the past couple of years. Specially, we do the following:

1. Present results on correlation dimension analysis and Liapunov exponent computation that confirm the chaotic nature of sea clutter, (i.e., radar backscatter from an ocean surface).
2. Use recursive prediction to further confirm the chaotic characterization of sea clutter.
3. Exploit the chaotic nature of sea clutter in the improved detection of small targets in the presence of clutter. In particular, we demonstrate an exciting application of Takens theorem, proving that a chaotic signal processor working on noncoherent radar data (i.e., amplitude component alone) can outperform a conventional Doppler processor requiring coherent data (i.e., amplitude and phase).

Wednesday, September 30th, 1992 at 1:30pm, room 3018

at

The Fields Institute

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