



סמינר בתקשורת ועיבוד אותות

You are invited to attend a lecture by
Israel Cohen

הנכם מוזמנים להרצאתו של
ישראל כהן *

בנושא:

SHIFT-INVARIANT ADAPTIVE WAVELET DECOMPOSITIONS AND APPLICATIONS

ייצוגי WAVELET מסתגלים משמרי-העתקה ויישומיהם

Adaptive representations in libraries of bases, including the wavelet-packet and local trigonometric decompositions (WPD, LTD), are widely used in various applications. Instead of representing a prescribed signal on a predetermined basis, it is useful to search for a suitable basis that would best fit a specified application. A major drawback restricting the use of such methods, particularly in statistical signal processing applications, such as detection, identification or noise removal (denoising), is the lack of shift-invariance. The expansion, as well as the information cost (measuring the suitability of the expansion for a particular application), may be significantly influenced by the alignment of the input signal with respect to the basis functions. Furthermore, the time-frequency tilings, produced by the best-basis expansions, do not generally conform to standard time-frequency energy distributions.

We develop a general approach for achieving shift-invariance, enhanced time-frequency decompositions and robust signal estimators using libraries of orthonormal bases. We present: (1) Shift-invariant best-basis expansions (e.g., *Shift-Invariant Wavelet Packet Decomposition* and *Shift-Invariant Adaptive-Polarity Local Trigonometric Decomposition*). The ensuing decompositions are proved advantageous to conventional expansions, such as the WPD and LTD. (2) Adaptive time-frequency distributions that satisfy various useful properties relevant to time-frequency analysis, including high energy concentration and suppressed interference terms. (3) Translation-invariant signal estimators (based on the *Minimum Description Length* criterion), which are combined with the adaptive time-frequency distributions. Synthetic and real data examples show the superiority of our approach compared to alternative existing methods.

*סטודנט לתואר שלישי בהנחיית פרופ' דוד מלאך ופרופ' שלום רז.

The lecture will take place
on Tuesday, 28.04.98 at 10:30
in Room 1061
Electrical Eng. Building
Technion City

ההרצאה תתקיים ביום ג' 28.4.1998
בשעה 10:30 בחדר 1061
בבנין הפקולטה להנדסת חשמל
קרית הטכניון