Time-frequency Analysis and Sparse Decomposition Methods in Biomedical Data Analysis and Complex Systems

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Abstract

We will talk about how time-frequency analysis arises in dealing with non-stationary data and signal processing, particularly those motivated by physiology and biomedicine. In addition to surveying the difficulty encountered in applying traditional signal analytical methods, a few relatively recent tools will be introduced, including the concept of sparse decomposition and its relation to subjects like compressed sensing. Moreover, we will present some new perspectives and progress regarding these issues, including an introduction to some of the speaker's own work. Finally, some related mathematical results and questions will also be discussed.