Spectral Techniques on Finite Non-Abelian Groups for Representation of Discrete Signals

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The talk is a review of recent developments in Fourier and Fourier-like representations for functions defined on finite non-Abelian groups. In the first part, we discuss Fourier and related functional expressions and the dixedral and alternative groups are used as examples. The second part discussed decision diagrams defined in terms of the Fourier series on finite non-Abelian groups. As examples, the quaternion and symmetric group of permutations are used. We also discuss complexity of both functional expressions and decision diagrams and the approaches for the related optimization problems. A brief discussion of areas of applications is provided and illustrated by examples.