

Algebraic Sparse Modeling and Applications

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Many problems in function analysis can be reformulated in terms of reconstruction of sums of exponential polynomials from truncated moment sequences. Gaspard-Clair-François-Marie Riche de Prony proposed in 1795 a method to compute the decomposition of functions in one variable as sums of exponentials, which reduces to the solution of a univariate polynomial. We describe a generalization of this approach to several variables, which involves algebraic ingredients such as duality, border basis and eigenvector solving. We show that the tensor decomposition problem can be tackled from this perspective and detail its geometric characteristics. We illustrate the approach by some applications of sparse reconstruction in signal analysis.