DETERMINANT OF A HANKEL MATRIX AND ITS APPLICATIONS TO INVERSE PROBLEMS

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Abstract: In this talk, we discuss the invertibility of a Hankel matrix whose elements are expressed as

$$c_{mn} = \sum_{j=1}^{M} \lambda_j \alpha_j^{m+n} + \sum_{j=1}^{N} \mu_j \beta_j^{m+n} + \sum_{j=1}^{N} \nu_j (m+n) \beta_j^{m+n-1}, \quad 0 \le m,\, n \le M + 2N$$

and apply it to various problems such as the inverse EEG problems and the frequency estimation problems for signals. Precisely, it is shown that the source locations (inverse EEG problem), and also the frequency components (frequency estimation problem) are the solutions of some characteristic equations related to the inverse of the Hankel matrix. Based on these observations, we provide detection algorithms.

References

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