

Kernel density estimation via diffusion and the complex exponentials approximation problem

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A kernel method is proposed to estimate the condensed density of the generalized eigenvalues of pencils of Hankel matrices whose elements have a joint noncentral Gaussian distribution with nonidentical covariance. These pencils arise when the complex exponentials approximation problem is considered in Gaussian noise. Several moments problems can be formulated in this framework and the estimation of the condensed density above is the main critical step for their solution. It is shown that the condensed density satisfies approximately a diffusion equation, which allows to estimate an optimal bandwidth. It is proved by simulation that good results can be obtained even when the signal-to-noise ratio is so small that other methods fail.

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