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How to learn N by N matrix by asking $\log \log N$ question using dimension free Bernstein—Remez inequality

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Suppose you wish to find a 2^n by 2^n matrix by asking this matrix question that it honestly answers. For example you can ask question “What is your $(1, 1)$ element?” Obviously you will need exponentially many questions like that. But if one knows some information on Fourier side one can ask only $\log n$ questions if they are carefully randomly chosen. Of course one pays the price: first of all one would find the matrix only with high confidence (high probability bigger than $1 - \delta$), secondly with the error ϵ . Such learning is known as PAC learning, PAC stands for ‘probably approximately correct’. The origins of the problem are in theoretical computer science, but the methods are pure harmonic analysis and probability. I will explain how this can be done using harmonic analysis and probability. The main ingredient is dimension free Bernstein—Remez inequality.