

## From Random Matrix Theory to Optimal Frequency Grids

Scalar sums of the form

$$\sum_{n=1}^{\infty} f(n)$$

with  $f$  being a continuous function appear in nearly every context of mathematics and physics. In many problems one has to resort to numerical summation techniques, for example if the function  $f(n)$  is the solution of some other complicated equation. In my talk I will present a new algorithm for numerical summation which is optimal for a large class of functions. The theory behind this algorithm has surprising connections to random matrix theory and matrix models in topological string theory. I will give some examples for the application of the algorithm and discuss its implications for random matrix theory and number theoretic applications.