Analysis Seminar

The quantization dimensions of measures

By

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Abstract: The quantization problem, originating from signal processing and also applicable in other domains, concerns the approximation of probability measures by finitely many points with respect to an L^p distortion measure. In various settings, the asymptotic behavior of the quantization error has been observed to follow a power law. The exponent of the power law also defines a notion of fractal dimension on measures, called the quantization dimension.

We present several properties satisfied by quantization dimensions, and show in particular that they generalize the notion of box-counting dimension and yield upper bounds for the Hausdorff dimension. For certain fractal domains, such as rectifiable curves or self-similar sets, quantization dimensions are also observed to coincide with the Hausdorff dimension. These results suggest that methods for quantization could be adapted to utilize the intrinsic dimension of the measure as opposed to the ambient space, and could conversely be used to estimate the dimensions or densities of measures.

Date: Thursday, May 5, 2022
Time: 18:00-19:00, GMT+3
Place: ZOOM
To request the event link, please send a message to goncha@fen.bilkent.edu.tr