

The restriction problem with moments

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In these paper we introduce a new type of restriction problem, called the *restriction problem with moments*.

Essentially, the restriction problem with moments is the restriction problem applied to a measure (as in the classical case) and moments of the measure. Moments of the measure correspond to derivatives of the Fourier transform, so we are, in effect, showing that the restriction problem can hold for certain tempered distributions. This is a new phenomenon.

We show that the Fourier transform of the surface area measure of the sphere S^{d-1} satisfies the restriction problem with moments if $1 \leq p < \frac{2(d+2)}{d+3}$. We prove a similar result for the Fourier transform of a Salem measure and show that it satisfies the restriction problem with moments if $1 \leq p < \frac{2(2-2\alpha+\beta)}{4(1-\alpha)+\beta}$ for certain values of α and β .