A Mass Transference Principle for systems of linear forms with applications to Diophantine approximation

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Abstract

In Diophantine approximation we are often interested in the Lebesgue and Hausdorff measures of certain lim sup sets. In 2006, Beresnevich and Velani proved a remarkable result - the Mass Transference Principle - which allows for the transference of Lebesgue measure theoretic statements for lim sup sets arising from a sequence of balls in $\mathbb{R}^k$ to Hausdorff measure theoretic statements. Subsequently, they extended this Mass Transference Principle to the more general situation in which the lim sup sets arise from a sequence of neighbourhoods of "approximating" planes. Recently we have been able to strengthen this latter result by removing some potentially restrictive conditions from the original statement. As a consequence, we can remove the remaining monotonicity condition from a Hausdorff measure analogue of the classical Khintchine-Groshev theorem.