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Fourier and Cauchy-Stieltjes transforms of power laws including stable distributions

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We introduce a class of probability measures whose densities near infinity are mixtures of Pareto distributions. This class can be characterized by the Fourier transform which has a power series expansion including real powers, not only integer powers. This class includes stable distributions in probability and also non-commutative probability theories. We also characterize the class in terms of the Cauchy-Stieltjes transform and the Voiculescu transform. If the stability index is greater than one, stable distributions in probability theory do not belong to that class, while they do in noncommutative probability.

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