



Super- vs sub-additivity shift in extreme quantiles of linear combination of heavy-tailed random variables

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We are interested in the local behavior of extreme quantiles of the sum of heavy tailed distributed random variables, of Fréchet type. More precisely, we want to study the sub- or super-additivity of the extreme quantiles, depending on the heaviness of the tail of the marginal distribution. To do so, we use first and second order properties of regular variation (RV) and show that, depending on the value of the shape parameter of the distribution, we may observe a transition phase from super to sub-additivity for extreme quantiles. This study is developed under the independence assumption, then the asymptotic independence one. Finally, we discuss applications to quantitative risk management.

Keywords: regular variation; local behavior; transition phase; risk measures