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A continuous updating weighted least squares estimator of tail dependence in high dimensions

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Likelihood-based procedures are a common way to estimate tail dependence parameters. They are not applicable, however, in non-differentiable models such as those arising from recent max-linear structural equation models. Moreover, they can be hard to compute in higher dimensions. An adaptive weighted least-squares procedure matching nonparametric estimates of the stable tail dependence function with the corresponding values of a parametrically specified proposal yields a novel minimum-distance estimator. The estimator is easy to calculate and applies to a wide range of sampling schemes and tail dependence models. In large samples, it is asymptotically normal with an explicit and estimable covariance matrix. The minimum distance obtained forms the basis of a goodness-of-fit statistic whose asymptotic distribution is chi-square. The estimator is applied to disentangle sources of tail dependence in European stock markets.

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