

1145-VT-1048 **Joseph Anderson*** (jtanderson@salisbury.edu), Mathematics and Computer Science, 1101
Camden Ave., Salisbury, MD 21801. *Robust Signal Processing with the Convex Floating
Body*. Preliminary report.

We present new algorithmic techniques for signal processing in the presence of heavy-tailed noise. Considering the problem of Independent Component Analysis, we consider the use of a geometric structure called the “Convex Floating Body” as an algorithmic surrogate for the distribution of a signal. This structure (defined for any non-degenerate distribution) is an approach to generalize statistical quantiles for higher dimensions, and enables one to capture important notions of data such as covariance, kurtosis, and higher-order moments. We provide provably efficient estimation techniques for the convex floating body in natural conditions, and show that we can solve the Independent Component Analysis (ICA) problem when the signals come from heavy-tailed distributions, even the Cauchy distribution. This extends the state-of-the-art which requires the source signals to have $1 + \epsilon$ finite moments.

We then discuss further applications for other robust-estimation settings, and how other notions of statistical depth functions can be used. (Received September 18, 2018)