

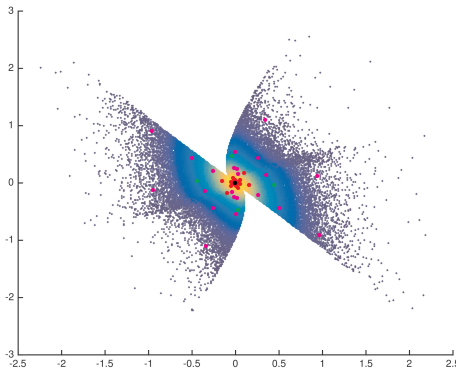
Student Research Talks (StReeTs)

George Mason University

Generalizing the Unscented Ensemble Transform to Higher Moments

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Abstract

We develop a new approach for estimating the expected values of functionals on multivariate non-Gaussian distributions. Rather than specifying an input distribution, we assume that we are only given the first four moments of the distribution. The goal is to summarize the distribution using a small number of quadrature nodes which are called σ -points. We choose the nodes and weights in order to match the specified moments of the distribution. The classical unscented ensemble matches the mean and covariance of a distribution and in this talk, we generalize the unscented ensemble by accounting for higher moments when creating the σ -points. It turns out that the key to matching higher moments is the rank-1 tensor decomposition. Together with appropriate weights, we can use the σ -points to estimate expected values. By passing the σ -points through a nonlinear function and applying our quadrature rule we can estimate the moments of the output distribution. By matching more moments of the input distribution, we demonstrate reduced error and we derive an upper bound on the error.

Date: Friday, November 22, 2019

Time: 2:30pm–3:20pm

Place: Exploratory Hall 4106

Pizza and soda will be served at the presentation.

For further information or for special accommodations (including dietary restrictions), please contact Tracey Oellerich or Cigole Thomas via email at toelleri@gmu.edu or cthoma40@gmu.edu by Thursday.