Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Clustered Numerical Data Analysis Using Markov Lie Monoid Based Networks JOSEPH JOHNSON, Physics Department University of South Carolina — We have designed and build an optimal numerical standardization algorithm that links numerical values with their associated units, error level, and defining metadata thus supporting automated data exchange and new levels of artificial intelligence (AI). The software manages all dimensional and error analysis and computational tracing. Tables of entities verses properties of these generalized numbers (called "metanumbers") support a transformation of each table into a network among the entities and another network among their properties where the network connection matrix is based upon a proximity metric between the two items. We previously proved that every network is isomorphic to the Lie algebra that generates continuous Markov transformations. We have also shown that the eigenvectors of these Markov matrices provide an agnostic clustering of the underlying patterns. We will present this methodology and show how our new work on conversion of scientific numerical data through this process can reveal underlying information clusters ordered by the eigenvalues. We will also show how the linking of clusters from different tables can be used to form a "supernet" of all numerical information supporting new initiatives in AI.

Joseph Johnson
Physics Department University of South Carolina

Date submitted: 10 Jan 2016 Electronic form version 1.4