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**Stefan Steinerberger\*** ([stefan.steinerberger@gmail.com](mailto:stefan.steinerberger@gmail.com)), 10 Hillhouse Avenue, New Haven, CT 06511. *Dimensionality Reduction via tSNE: an analysis via large-scale ODE systems.*

We study the problem of dimensionality reduction: given a set of high-dimensional points, we would like to get a 2D map of these points preserving essential structures so we can look at it. One of the most widely used algorithms is t-SNE (t-distributed stochastic neighborhood embedding); until recently, no mathematical analysis was available. We show how it can be interpreted as a large coupled system of ODEs; this interpretation allowed us to rigorously prove that the algorithm works in certain cases (indeed, this was the first rigorous argument for tSNE), to establish a connection to classical Laplacian eigenmaps and it also suggests a series of open problems. (Received August 17, 2019)