

1154-37-651

**Mohammad Farazmand\*** ([farazmand@ncsu.edu](mailto:farazmand@ncsu.edu)). *Physics-compatible metrics for clustering algorithms.*

Clustering of high-dimensional data is routinely used for understanding dynamics and developing efficient control strategies. Clustering algorithms often use a measure of distance between data points to assess their proximity. The familiar Euclidean distance is the prevalent choice of metric for clustering algorithms. While the Euclidean metric is useful in many applications, we show that it can lead to unsatisfactory results in the context of nonlinear dynamics. By leveraging the physics of the problem (such as its conserved quantities or its variational structure), we show how to devise more meaningful metrics that lead to physically relevant clusters. (Received September 09, 2019)