1163-65-515 **Alexander Cloninger*** (acloninger@ucsd.edu), 9500 Gilman Rd, La Jolla, CA 92093, and **Caroline Moosmueller** (cmoosmueller@ucsd.edu), 9500 Gilman Rd, La Jolla, CA 92093. *Fast Pairwise Optimal Transport and Linear Classification for Nonlinear Problems.*

Discriminating between distributions is an important problem in a number of scientific fields. This motivated the introduction of Linear Optimal Transportation (LOT), which has a number of benefits when it comes to speed of computation and to determining classification boundaries. In this paper, we characterize a number of settings in which the LOT embeds families of distributions into a space in which they are linearly separable. This is true in arbitrary dimension, and for families of distributions generated through perturbations of shifts and scalings of a fixed distribution. The transform is defined by computing the optimal transport of each distribution to a fixed reference distribution, and considering distances between the transport maps. We also prove conditions under which LOT between two distributions is nearly isometric to Wasserstein-2 distance between those distributions. This is of significant computational benefit, as one must only compute K optimal transport maps to define the K^2 pairwise distances between the K distributions. We demonstrate the benefits of LOT on a number of distribution classification problems. (Received September 08, 2020)