1153-90-24 **Evan Patterson*** (epatters@stanford.edu). *Hausdorff and Wasserstein metrics on graphs and other structured data.*

Optimal transport is widely used in pure and applied mathematics to find probabilistic solutions to hard combinatorial matching problems. We extend the Wasserstein metric and other elements of optimal transport from the matching of sets to the matching of graphs and other structured data. This structure-preserving form of optimal transport relaxes the usual notion of homomorphism between structures. It applies to graphs, directed and undirected, labeled and unlabeled, and to any other structure that can be realized as a $C$-set for some finitely presented category $C$. We construct both Hausdorff-style and Wasserstein-style metrics on $C$-sets and we show that the latter are convex relaxations of the former. Like the classical Wasserstein metric, the Wasserstein metric on $C$-sets is the value of a linear program and is therefore efficiently computable. (Received July 21, 2019)