1135-00-2946 **Samir Chowdhury*** (chowdhury.57@osu.edu), Department of Mathematics, The Ohio State University, 231 W 18th Ave, Columbus, OH 43210, and **Facundo Mémoli** (memoli@math.osu.edu), Department of Mathematics, The Ohio State University, 231 W 18th Ave, Columbus, OH 43210. *Distances between Networks and the Stability of Network Invariants.*

Techniques from the shape matching and metric geometry literature have recently been applied to perform stable hierarchical clustering and persistent homology on directed, weighted network data (sets of nodes with possibly asymmetric pairwise relations, i.e. finite real-valued square matrices). The main workhorse in this approach is a network distance $d_{\mathcal{N}}$ resembling the Gromov-Hausdorff distance between metric spaces that induces a pseudometric structure on the collection of all finite square matrices. Previous work using $d_{\mathcal{N}}$ does not address the "continuous limits" of sequences of finite networks, which are important for modeling very large networks. We prove that the limit of a $d_{\mathcal{N}}$-convergent sequence of finite networks is a compact topological space with a continuous edge-weight function. We develop the notion of sampling finite networks from such spaces and use these results to precisely characterize the networks satisfying $d_{\mathcal{N}}(\cdot,\cdot) = 0$. For practical use, we identify readily computable network invariants by drawing analogies with the shape matching literature. Using these invariants, we provide a simple polynomial-time algorithm that computes a lower bound on the $d_{\mathcal{N}}$-distance between two networks. (Received September 26, 2017)