1164-51-41 **Facundo Memoli***, Department of Mathematics, The Ohio State University, Columbus, OH 43210, and **Zane Smith** and **Zhengchao Wan**. *The Gromov-Hausdorff distance between ultrametric spaces.*

The Gromov-Hausdorff (GH) distance (d_{GH}) provides a natural dissimilarity measure between any two given metric spaces. Computing d_{GH} is NP-hard, even in the case of finite ultrametric spaces.

We identify a one parameter family $\{d_{\mathrm{GH}}^{(p)}\}_{p\in[1,\infty]}$ of distances with a flavor similar to the GH distance s.t. $d_{\mathrm{GH}}^{(1)} = d_{\mathrm{GH}}$. The extreme case, $p = \infty$, yields an ultrametric $u_{\mathrm{GH}} = d_{\mathrm{GH}}^{(\infty)}$. on the collection of all ultrametric spaces. u_{GH} is more structured than all other $d_{\mathrm{GH}}^{(p)}$ when $p < \infty$ which results in very distinct computational behaviours: whereas for all $p \in [1,\infty)$, $d_{\mathrm{GH}}^{(p)}$ yields NP-hard problems, u_{GH} can be computed in polynomial time. In order to prove this, we establish a structural theorem for u_{GH} which we exploit to devise a polynomial time algorithm for computing this distance.

We also establish a structural theorem for the restriction of d_{GH} to the collection of all compact ultrametric spaces which allows us to devise a fixed parameter tractable dynamic programming algorithm for computing its exact value between any two finite ultrametric spaces. (Received January 07, 2021)