

CoGeTo

CONVEX GEOMETRY TOOLS FOR TYPOLOGICAL ANALYSIS

In brief

CoGeTo is a web app that allows you to work out the predictions of your linguistic theory. It provides a suite of tools that exploit the rich convex geometry underlying constraint-based phonology to extract typological information without ever enumerating the typology. These tools thus allow you to analyze not only categorical typologies in OT and HG, but also infinite probabilistic typologies in Stochastic OT, Noisy HG, and Maxent.

In more detail

In categorical theories, typologies can be exhaustively listed and directly inspected (at least in principle) because they are usually finite. In probabilistic theories, that won't work because a typology consists of an infinite number of probability distributions. A natural strategy that gets around this problem is to enumerate, not the individual languages, grammars, or distributions, but the universals hidden in the typology (Greenberg 1963). CoGeTo exploits the rich convex geometry underlying constraint-based phonology to compute universals without enumerating the typology. The current implementation (version 1.0) computes three types of universals:

- POSITIVE ABSOLUTE UNIVERSALS: which phonological structures are necessarily present/most probable in every language in the typology?
- NEGATIVE ABSOLUTE UNIVERSALS: which phonological structures are impossible/least probable in every language in the typology?
- IMPLICATIONAL UNIVERSALS: if a language in the typology has a certain phonological structure, what other structures are also guaranteed to be present/to be at least as probable in that language?

How does it work?

All you need is a grammar spreadsheet (.xls) in the OTSoft/OTHelp format, with inputs, candidates, and violations. A sample input file is available [here](#). Simply go to <https://cogeto.stanford.edu>, upload your grammar, and start running CoGeTo.

Help

[Here](#) you can find a manual that explains how to read the output produced by CoGeTo. For questions or bug reports, please contact us at magrigr@gmail.com or anttila@stanford.edu.

Some work that uses CoGeTo

- Anttila, Arto, Scott Borgeson, and Giorgio Magri. 2019. [Equiprobable mappings in weighted constraint grammars](#). In *Proceedings of the 16th SIGMORPHON Workshop on Computational Research in Phonetics, Phonology, and Morphology*.
- Anttila, Arto and Giorgio Magri. 2018. [Does MaxEnt Overgenerate? Implicational Universals in Maximum Entropy Grammar](#). In Gallagher, Gillian, Maria Gouskova, and Sora Yin (eds.), *Proceedings of the 2017 Annual Meeting on Phonology*. Washington, DC: Linguistic Society of America.

Citing

Giorgio Magri and Arto Anttila. 2019. [CoGeTo: Convex Geometry Tools for typological analysis in categorical and probabilistic constraint-based phonology](#) (Version 1.0).
