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A geometrical-combinatorial analysis of vowel phoneme dissimilarities

I shall introduce a geometrical-combinatorial model applicable to synchronic and diachronic analysis of vowel inventories and of their dissimilarities across the borders or the centuries. The basic idea generating this model is the tessellation of the 2-dimensional vowel space by means of Voronoi domains. Any human vowel will be thus classified according to its being closest to a certain vowel of the given inventory. Then, by intersecting Voronoi diagrams of different inventories coming from a common ancestor, one can get a feeling of where the old inventory was placed. Intersection of Voronoi diagrams can be also helpful when trying to devise new, artificial inventories which are best comprehended, and categorised, by many different inventories at the same time (e.g. in multilingual areas near the borders of states). The study of vowels using Voronoi domains easily leads to consider graph theoretical issues, some of which are also interesting on their own right. For example, some clear connections can be pointed out with Hall's Marriage theorem on matchings of bipartite graphs. Finally, Thom's Catastrophe Theory is expected to be effectively applicable to the Voronoi framework, thus allowing to give a dynamical flavour to all the matter. On the possible, future, developments of such marriage I shall linger in the end of the talk.