1154-90-1716   **Steffen Borgwardt*** (`steffen.borgwardt@ucdenver.edu`), University of Colorado Denver, Dep. of Mathematical and Statistical Sciences, 1201 Larimer Street, Suite 4000, Denver, CO 80204, and **Charles Viss**. *Constructing Clustering Transformations.*

Clustering is one of the fundamental tasks in data analytics and machine learning. In many situations, different clusterings of the same data set become relevant. For example, different algorithms for the same clustering task may return dramatically different solutions. We are interested in applications in which one clustering has to be transformed into another; e.g., when a gradual transition from an old solution to a new one is required.

We devise methods for constructing such a transition based on linear programming and network theory. We use a so-called clustering-difference graph to model the desired transformation and provide methods for decomposing the graph into a sequence of elementary moves that accomplishes the transformation. These moves are equivalent to the edge directions, or circuits, of the underlying partition polytopes. Therefore, in addition to a conceptually new metric for measuring the distance between clusterings, we provide new bounds on the circuit diameter of these polytopes. (Received September 16, 2019)