

1023-D1-1419      **Michael A. Jones\*** ([jonesm@mail.montclair.edu](mailto:jonesm@mail.montclair.edu)), Department of Mathematical Sciences,  
Montclair State University, Montclair, NJ 07043. *The Geometry Behind Paradoxes of Voting  
Power.*

Despite the many useful applications of power indices, the literature on power indices is raft with counterintuitive results or paradoxes, as well as real-life institutions that exhibit these behaviors. This has led to a cataloging of sorts where new and different paradoxes are calculated and then shown to exist in nature. Even though the paradoxes sound different from one another, they can be classified by the underlying geometric properties that induce the counterintuitive results. Perhaps surprisingly, analyzing the geometry behind the paradoxes for three voters is sufficient to understand the geometry behind the paradoxes. Simple weighted-voting games are nonnegative integer solutions to an equation. Voting power induces a partition on games where two games are in the same part if each player  $i$  has the same power in each game. Games are embedded in a simplex and geometry is used to examine paradoxes of voting power. The paradoxes are a result of three geometric ideas and how they interact with the partition: a point passing a hyperplane thereby changing parts, moving hyperplanes that change the size or number of parts in a partition, and changing the dimension of the space by adding or subtracting a voter. (Received September 26, 2006)