1077-91-580 **Nicolas Houy** and **William S. Zwicker*** (zwickerw@union.edu), Department of Mathematics, Union College, Schenectady, NY 12308. *The geometry of influence: weighted voting and hyper-ellipsoids.*

We provide three new characterizations of weighted voting, each based on the intuition that for weighted rules, winning coalitions are close to one another. The "small spread" and "tightly packed" characterizations use a Hamming metric, as modified by a vector B of Hamming weights. In "Ellipsoidal separability", which employs the Euclidean metric, the separating hyper-ellipsoid E contains all winning coalitions, omits all losing ones, and is centered at the barycenter of all winning coalitions. The proportions of E are determined by this same vector B, which bears a surprising relationship to the vector of voting weights; the i^{th} Hamming weight b_i is given by the ratio $\frac{w_i}{\eta_i}$ of player i's voting weight w_i to her Penrose-Banzhaf voting power η_i. The ellipsoid's geometry thus reflects the relationship between weight and influence. For example, the spherically separable rules are precisely those weighted rules for which the players' Penrose-Banzhaf voting powers can serve as their voting weights. (Received September 07, 2011)