1086-91-938 **Davide Cervone**, **Christopher Hardin** and **William S. Zwicker*** (zwickerw@union.edu), Mathematics Department, Union College, Schenectady, NY 12308. *Higher order Condorcet cycles.* Preliminary report.

Suppose a ballot consists of a strict ranking of all alternatives in A, a finite set. When y is a single alternative and X is a set of alternatives, $P(y, X)$ stands for the set of voters who prefer y to all $x \in X$. In a *Condorcet cycle*, each alternative is beaten by some other; for each $x \in A$ there exists a y for which $P(y, \{x\})$ contains a majority of the voters. In a *uniform Condorcet cycle of order* k, for each set X of k alternatives $P(y, X)$ contains a majority for some y. If we weaken this condition, asking only that a y exist for which $P(y, x)$ contains a majority for each $x \in X$, we have a *Condorcet cycle of order* k. Which higher order cycles exist? Elkind, Lang, and Saffidine found a uniform order 2 cycle of size $(15, 15)$ (15 alternatives, 15 voters). Using different methods we construct an order 2 cycle of size $(7, 7)$, uniform order 2 cycles of sizes $(11, 11)$ and $(7, 21)$, and an order 3 cycle of size (19, ?). Order 2 cycles cannot have fewer than 7 alternatives and order k cycles exist for each $k \geq 2$. Do uniform order 3 cycles exist? (Received September 16, 2012)