

7th Feb 2020

CRITERION.

Majority ★

if a candidate receives a majority of the first place, they win

Condorcet criterion

The winning candidate should win against each other candidate in the pair wise election if such candidate exists

Simple majority for 2

In a two-way election, the system should agree with simple majority

Coward:

If a candidate drops out the remaining ranking should not change

Pareto condition

★
Unanimity If every voter ranks X first, then X wins

★
Every vote counts :
For all voters, there exists a voting profile in which a change in the voter preference change in the outcome

At least more than half bad

A candidate cannot win if they do not receive any votes higher than $\frac{1}{2}$ or $\frac{1}{2} + \epsilon$ of the number of rankings

Score losers:

If the losing candidate drops out, the remaining rankings should not be affected

I.I.A (Independence of irrelevant alternative)

if a voter moves candidate

If every voter votes X to Y ,
then Y does not win

" X on their list but leaves
all the others relatively
the same. The other
candidates e.g Y and Z
should still rank the
same relatively in the
rankings

HW question review:

For sequential pairwise

There exists a
Condorcet winner if and only if
all agendas
produce the same
winner

Proof:

First show if there exists a Condorcet winner
then all agendas lead to the same winner.

That candidate wins every pairwise race and
thus cannot be eliminated. They emerge victorious

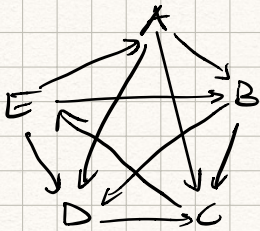
Now suppose there is no Condorcet winner. We
will show there are at least two candidates that
can win.

Consider a non-Condorcet winner, such that A
loses at least one pairwise bracket to candidate
 C for instance. In the event that candidate A
faces candidate C , A will be eliminated and another
candidate will win. If C is eliminated without
facing A , A will win. Thus we have at least
two outcomes with a non-Condorcet race with more
than two candidates.

In every election someone must win. Let A be a winner. Because there is no condorcet winner, A must lose to at least one candidate in pairwise say C. In the agenda where A and C start facing, A loses and someone else wins.

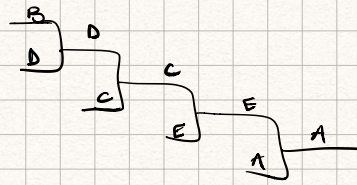
Consider this election

Method for pairwise comparison.



Consider : - complete graph
- directed

: this equals \Rightarrow



Adjacency matrix

		in				
		A	B	C	D	E
out	A	0	1	1	1	-1
	B	-1	0	1	1	-1
	C	-1	-1	0	-1	1
	D	-1	-1	1	0	-1
	E	1	1	-1	1	0