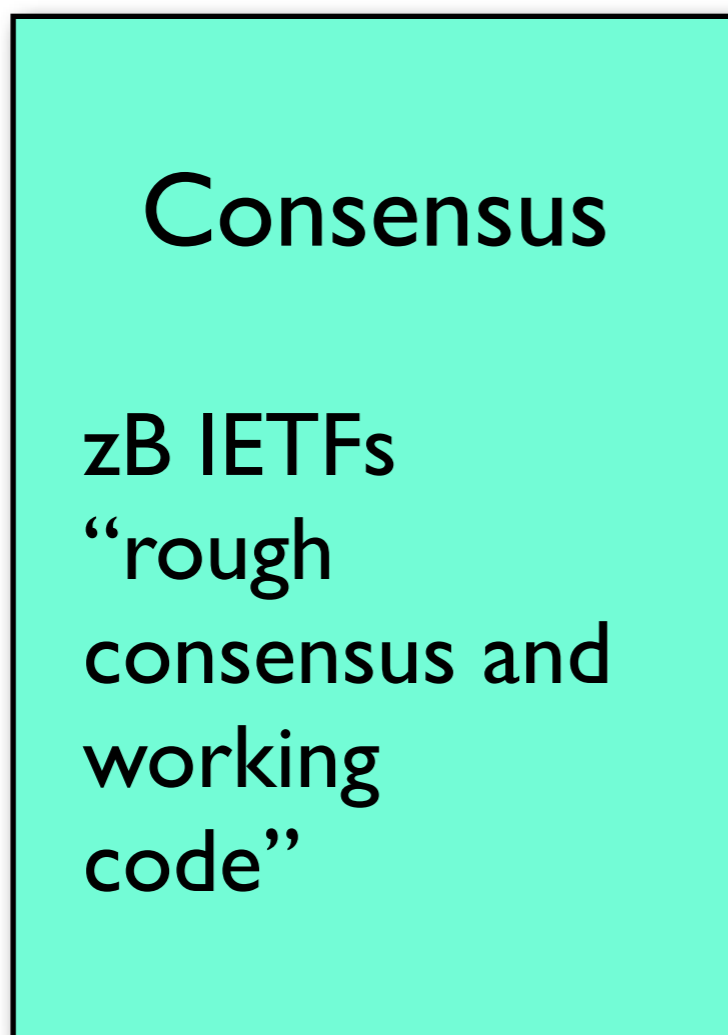


voting

eine ein klein wenig theoretische Betrachtung im Rahmen
von [gametheory]

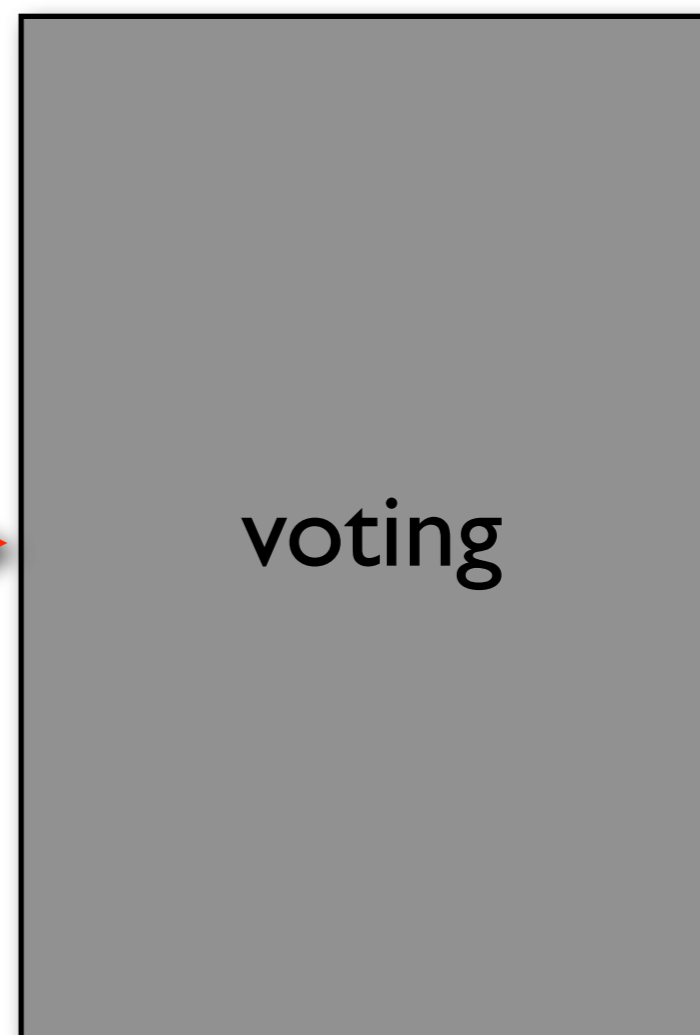
Aaron Kaplan
aaron@lo-res.org
Wien, Mai 2006

why vote at all?



Quakers, Iroquois,
anarchists, Ijmā‘ (إجماع)...

vs.



voting theory seit
franz. revolution

consensus bei den Quakern

- Multiple concerns and information are shared until the sense of the group is clear
- Discussion involves active listening and sharing of information
- **Norms limit number of times one asks to speak** to ensure that each speaker is fully heard.
- **Ideas and solutions belong to the group; no names are recorded.**
- **Differences** are resolved by **discussion**. The [facilitator](#) ("clerk" or "convenor" in the Quaker model) identifies areas of agreement and names disagreements to push discussion deeper.
- The facilitator articulates the sense of the discussion, asks if there are other concerns, and proposes a [minute](#) of the decision.
- The group as a whole is responsible for the decision, and the decision belongs to the group.
- The facilitator can discern if one who is not uniting with the decision is acting without concern for the group or in selfish interest.

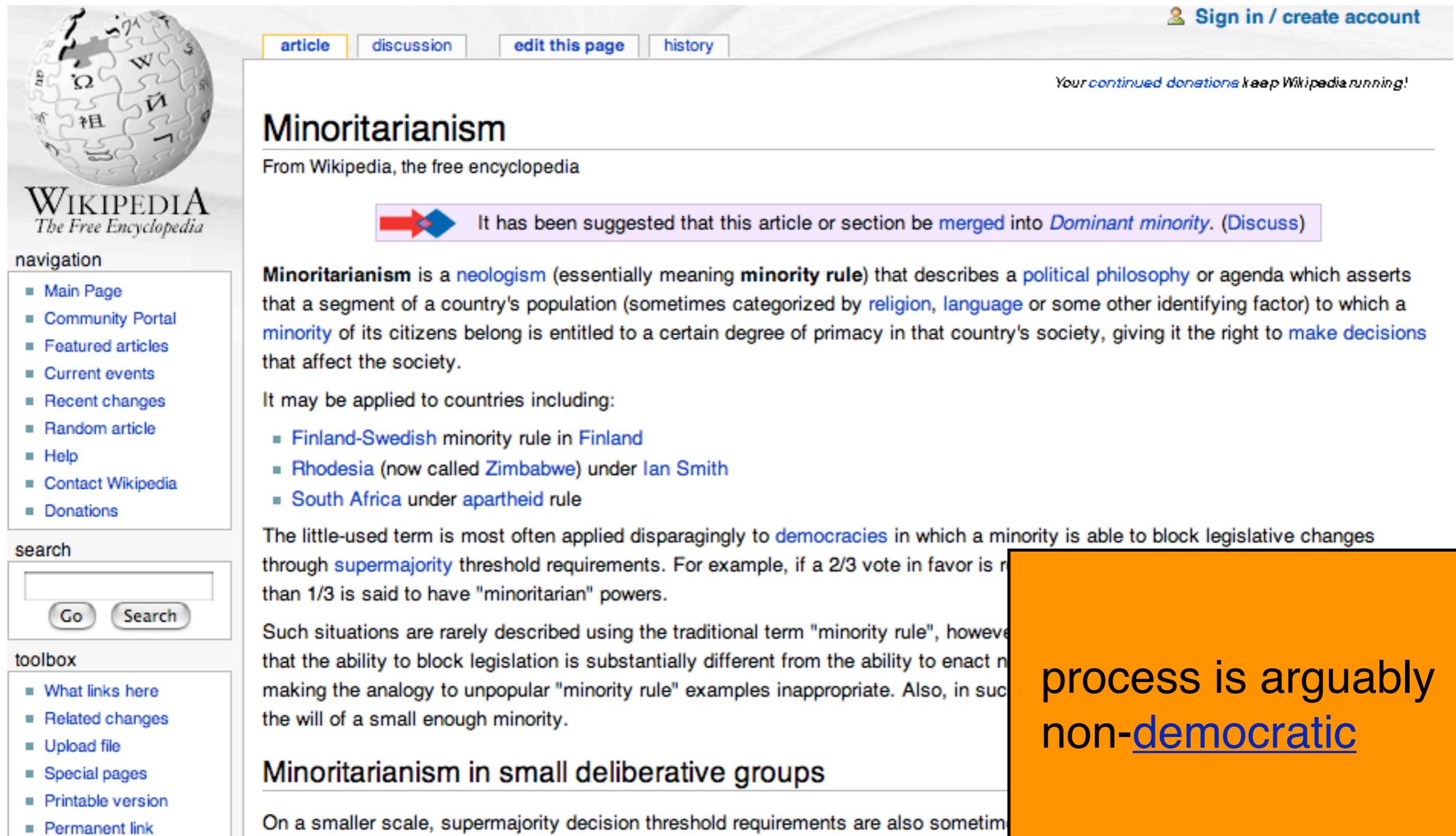
RFC 2418

- Working groups make decisions through a "**rough consensus**" process. IETF consensus does **not require that all participants agree** although this is, of course, preferred. In general, the dominant view of the working group shall prevail. (However, it must be noted that "**dominance**" **is not to be determined on the basis of volume or persistence**, but rather a more general sense of agreement). Consensus can be determined by a show of hands, humming, or any other means on which the WG agrees (by rough consensus, of course). **Note that 51% of the working group does not qualify as "rough consensus"** and 99% is better than rough. **It is up to the Chair to determine if rough consensus** has been reached (IETF Working Group Guidelines and Procedures).
- IETF kommuniziert über Mailinglists

Nachteile(?) von consensus based modellen

- u.U: Minority kann alles blockieren
- welche gruppe hat “power over process”?
- Langsam! (vgl. Ents bei LOTR)
- man muss “sich mögen”/**es muss ein gemeinsames Ziel geben**
- Skaliert nur bis zu einer gewissen Größe,
- oft: Chair entscheidet letztendlich / informal pressure
- etc...

Nachteil: Minority block



The image shows a screenshot of a Wikipedia article titled "Minoritarianism". At the top right, there is a "Sign in / create account" link. Below it, navigation tabs for "article", "discussion", "edit this page", and "history" are visible. A banner at the top right reads "Your continued donations keep Wikipedia running!". The article title "Minoritarianism" is followed by the text "From Wikipedia, the free encyclopedia". A prominent merge suggestion box is overlaid on the article, containing a red arrow pointing right and a blue arrow pointing left, with the text: "It has been suggested that this article or section be merged into *Dominant minority*. (Discuss)". The main text of the article defines "Minoritarianism" as a neologism meaning "minority rule" and describes it as a political philosophy. It lists examples of countries where it may be applied: Finland-Swedish minority rule in Finland, Rhodesia (now Zimbabwe) under Ian Smith, and South Africa under apartheid rule. The text also discusses how the term is often used disparagingly to describe democracies with supermajority requirements. At the bottom, there is a section header "Minoritarianism in small deliberative groups" and the beginning of a paragraph: "On a smaller scale, supermajority decision threshold requirements are also sometimes".

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Minoritarianism

From Wikipedia, the free encyclopedia

→ It has been suggested that this article or section be merged into *Dominant minority*. (Discuss)

Minoritarianism is a **neologism** (essentially meaning **minority rule**) that describes a **political philosophy** or agenda which asserts that a segment of a country's population (sometimes categorized by **religion**, **language** or some other identifying factor) to which a **minority** of its citizens belong is entitled to a certain degree of primacy in that country's society, giving it the right to **make decisions** that affect the society.

It may be applied to countries including:

- [Finland-Swedish minority rule in Finland](#)
- [Rhodesia \(now called Zimbabwe\) under Ian Smith](#)
- [South Africa under apartheid rule](#)

The little-used term is most often applied disparagingly to **democracies** in which a minority is able to block legislative changes through **supermajority** threshold requirements. For example, if a 2/3 vote in favor is required and a 2/3 vote in opposition is more than 1/3 is said to have "minoritarian" powers.

Such situations are rarely described using the traditional term "minority rule", however, because the ability to block legislation is substantially different from the ability to enact new legislation, making the analogy to unpopular "minority rule" examples inappropriate. Also, in such situations, the will of a small enough minority.

Minoritarianism in small deliberative groups

On a smaller scale, supermajority decision threshold requirements are also sometimes

process is arguably non-democratic

Enter voting...

- **Function** for **choosing** among options based on **input** of a number of voters
 $f(\text{voter_opinions}) = \text{result_i}$
- can be used for politics, prizes, select plan of action, by computer program, ...
- Voting theory = mathe + politikwissenschaften + economics

Vorausblick: Nachteil bei Voting

- No die Mehrheit wue des oba ned!
Klar, weil es gibt **voting paradoxes**
- Wenn es ≥ 3 Optionen gibt, dann kann es vorkommen, dass die Mehrheit keine Lösung gerne hat (zyklische Präferenzen)
- Tactical voting, burying, spoiler effect (=Nader effect), clones, strategic nomination, Arrow's Theorem, Gibbard-Satterthwaite Theorem, ...
- Idealerweise sollte die Mehrheit ihren Wunsch durchsetzen können. Schlecht für Kunst (?)

Beispiele von voting systemen

first past the poll

- Winner takes it all
- Bsp. Florida.
- vor allem im UK&Commonwealth verbreitet

run-off

- Stichwahlprinzip
- vgl. präsidentenwahlen in Finnland

Round 1	Round 2
<input type="checkbox"/> Joe Smith	<input type="checkbox"/> Jane Doe
<input checked="" type="checkbox"/> John Citizen	<input checked="" type="checkbox"/> Mary Hill
<input type="checkbox"/> Jane Doe	
<input type="checkbox"/> Fred Rubble	
<input type="checkbox"/> Mary Hill	

Condorcet

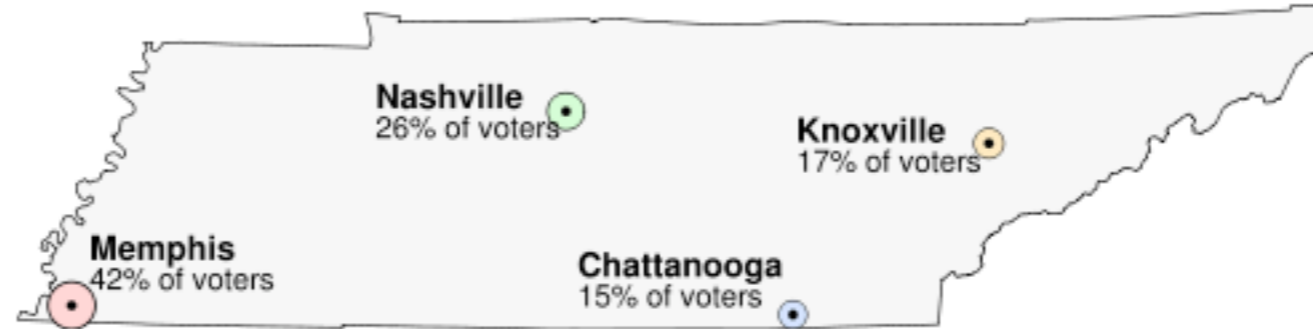
- Reihung
- jede Kandidat wird mit jedem anderen verglichen.
- “Condorcet Winner”
- Verlierer jedes Vergleichs scheidet aus.
- A B C
B C A
C A B



An example

[edit]

Imagine that the population of **Tennessee**, a state in the **United States**, is voting on the location of its **capital**. The population of Tennessee is concentrated around its four major cities, which are spread throughout the state. For this example, suppose that the entire **electorate** live in one of these four cities, and that they would like the capital to be established as close to their city as possible.



The candidates for the capital are:

- **Memphis**, the state's largest city, with 42% of the voters, but located far from the other cities
- **Nashville**, with 26% of the voters
- **Knoxville**, with 17% of the voters
- **Chattanooga**, with 15% of the voters

The preferences of the voters would be divided like this:

42% of voters (close to Memphis)	26% of voters (close to Nashville)	15% of voters (close to Chattanooga)	17% of voters (close to Knoxville)
1. Memphis	1. Nashville	1. Chattanooga	1. Knoxville
2. Nashville	2. Chattanooga	2. Knoxville	2. Chattanooga
3. Chattanooga	3. Knoxville	3. Nashville	3. Nashville
4. Knoxville	4. Memphis	4. Memphis	4. Memphis

Concordet Bsp

To find the Condorcet winner every candidate must be matched against every other candidate in a series of imaginary one-on-one contests. In each pairing the winner is the candidate preferred by a majority of voters. When results for every possible pairing have been found they are as follows:

Pair	Winner
Memphis (42%) vs. Nashville (58%)	Nashville
Memphis (42%) vs. Chattanooga (58%)	Chattanooga
Memphis (42%) vs. Knoxville (58%)	Knoxville
Nashville (68%) vs. Chattanooga (32%)	Nashville

Schulze Methode

- moderne (1997) Variante von Concorcet mit Condorcet winner

Procedure

Suppose $d[V,W]$ is the number of voters who strictly prefer candidate V to candidate W.

A *path* from candidate X to candidate Y of strength z is an ordered set of candidates $C(1), \dots, C(n)$ with the following four properties:

1. $C(1)$ is identical to X.
2. $C(n)$ is identical to Y.
3. For $i = 1, \dots, (n-1)$: $d[C(i), C(i+1)] > d[C(i+1), C(i)]$.
4. For $i = 1, \dots, (n-1)$: $d[C(i), C(i+1)] \geq z$.

If there is a p such that there is a path from candidate A to candidate B of strength p and no path from candidate B to candidate A of strength p, then candidate A *disqualifies* candidate B.

Satisfied criteria

The Schulze method satisfies the following criteria:

1. [Non-imposition](#) (a.k.a. [citizen sovereignty](#))
2. [Non-dictatorial](#)
3. [Pareto criterion](#)
4. [Monotonicity criterion](#) (a.k.a. [mono-raise](#))
5. [Majority criterion](#)
6. [Condorcet criterion](#) (a.k.a. [Condorcet winner criterion](#))
7. [Condorcet loser criterion](#)
8. [Smith criterion](#) (a.k.a. [Generalized Condorcet criterion](#))
9. [Schwartz criterion](#)
10. [Local independence from irrelevant alternatives](#) (see below)
11. [Mutual majority criterion](#)
12. [Independence of clones](#) (See clones)
13. [Reversal symmetry](#)
14. [Mono-append](#) [↗](#)
15. [Mono-add-plump](#) [↗](#)
16. [Resolvability criterion](#)

If [winning votes](#) is used as the definition of defeat strength, it also satisfies:

1. [Woodall's plurality criterion](#)
2. [Woodall's CDTT criterion](#) [↗](#)

If [margins](#) as defeat strength is used, it also satisfies:

1. [Symmetric-completion](#) [↗](#)

Failed criteria

The Schulze method violates the following criteria:

1. All criteria that are incompatible with the [Condorcet criterion](#) (e.g. [independence from irrelevant alternatives](#), [participation](#), [consistency](#), [invulnerability to compromising](#), [invulnerability to burying](#), [later-no-harm](#) [↗](#), [later-no-help](#) [↗](#))
2. The Schulze method doesn't guarantee that the winner is always chosen from the [uncovered set](#) [↗](#).
3. [Mono-remove-bottom](#) [↗](#)
4. [Mono-add-top](#) [↗](#)

Schulze (2)

- **Wo wird es verwendet?
Debian, Wikipedia**

Borda

- Reihung
- jede Position in der Reihung wird gewichtet
- 1ster hat gewicht n , 2ter $(n-1)$, 3ter $(n-2)$, etc
- Kandidat mit den meisten Punkten gewinnt
- Wird zB f. d. Nationalrat in Slovenien verwendet

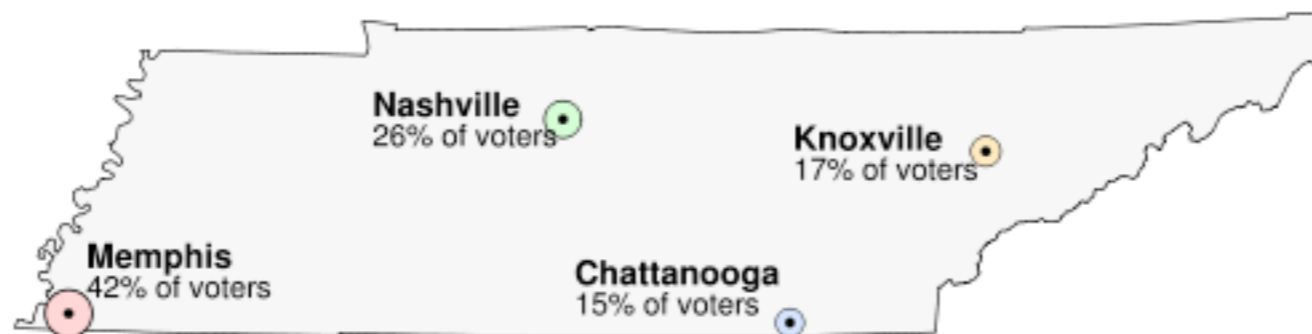


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3. Chattanooga	3. Knoxville	3. Nashville	3. Nashville
4. Knoxville	4. Memphis	4. Memphis	4. Memphis

Borda (2)

If the various rankings given to each candidate are added up they are as follows.

City	First	Second	Third	Fourth
Memphis	42%	0%	0%	58%
Nashville	26%	42%	32%	0%
Chattanooga	15%	43%	42%	0%
Knoxville	17%	15%	26%	42%

It can be seen above, for example, that Chattanooga is ranked first by 15% of voters, second by 43%, third by 42%, and last by no voters at all. To give points to each candidate for these rankings this example will use the formula, explained above, whereby

Überblick

- Tactical voting
- Strategic nomination
- Arrows Theorem
- Cycles (voting paradox)
- Gibbard-Satterthwaite theorem

Tactical voting und andere Probleme

Gibbard-Satterthwaite theorem

- any voting method which is completely strategy-free must be either dictatorial or nondeterministic

Gibbard-Satterthwaite theorem (2)



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Gibbard-Satterthwaite theorem

From Wikipedia, the free encyclopedia

The **Gibbard–Satterthwaite theorem** is a result about [voting systems](#) designed to choose a single winner from the preferences of certain individuals, where each individual ranks all candidates in order of preference. It states that, for three or more candidates, one of the following three things must hold for every voting rule:

1. The rule is dictatorial, or
2. There is some candidate who cannot win, under the rule, in any circumstances, or
3. The rule is manipulable (i.e. susceptible to [tactical voting](#)), in the sense that there are conditions under which a voter with full knowledge of how the other voters are to vote and of the rule being used would have an incentive to, by voting in a manner that does not reflect his preferences, ensure the victory of a candidate whom the voter prefers to the candidate the rule would generate if the voter revealed his true preferences.

Since rules which forbid certain candidates from winning or which are dictatorial are not suitable for real-life voting systems, all democratic systems either are manipulable or do not meet the preconditions of the theorem.

[Arrow's impossibility theorem](#) is a similar theorem that deals with [voting systems](#) designed to yield a complete preference order of the candidates, rather than only choosing a winner.

External links

[\[edit\]](#)

- [The Proof of the Gibbard–Satterthwaite Theorem Revisited](#) [↗](#)
- [Arrow's Theorem and the Gibbard–Satterthwaite Theorem: A Unified Approach](#) [↗](#)

This [applied mathematics-related article](#) is a [stub](#). You can [help Wikipedia](#) by [expanding it](#) [↗](#).

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Arrow's Theorem

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Arrow's impossibility theorem

From Wikipedia, the free encyclopedia

In [voting systems](#), **Arrow's impossibility theorem**, or **Arrow's paradox**, demonstrates that no voting system can possibly meet a certain set of reasonable criteria when there are three or more options to choose from. These criteria are called *unrestricted domain*, *non-imposition*, *non-dictatorship*, [monotonicity](#), and [independence of irrelevant alternatives](#), and are defined below.

The theorem is named after economist [Kenneth Arrow](#), who demonstrated the theorem in his [Ph.D.](#) thesis and popularized it in his [1951](#) book *Social Choice and Individual Values*.

The original paper was entitled "A Difficulty in the Concept of Social Welfare" and can be found in *The Journal of Political Economy*, Volume 58, Issue 4 (August, 1950), pages 328-346.

Arrow was a co-recipient of the [1972 Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel](#) (popularly known as the "Nobel Prize in Economics").

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- [2 Formal statement of the theorem](#)
- [3 Interpretations of the theorem](#)
- [4 Other possibilities](#)
- [5 Scalar rankings from a vector of attributes and the IIA property](#)
- [6 References](#)
- [7 See also](#)
- [8 External links](#)

Statement of the theorem

[\[edit\]](#)

The need to aggregate [preferences](#) occurs in many different disciplines: in [welfare economics](#), where one attempts to find an economic outcome which would be acceptable and stable; in decision making, where a person has to make a rational choice

Tactical voting

- **burying**: absichtliches runtersetzen eines Kandidaten bei Reihungen
- **Push-over** is a type of tactical voting in which a voter ranks a perceived weak alternative higher, but not in the hopes of getting it elected

**Das war erst der
Anfang... vielen Dank!**