Single-winner Voting Method Comparison Chart

This chart compares the most widely discussed voting methods for electing a single winner (and thus does not deal with multi-seat or proportional representation methods). There are countless possible evaluation criteria. The Criteria at the top of the list are those we believe are most important to U.S. voters.

	Plurality (FPTP)[1]	Two-Round Runoff[2]	Instant Runoff (IRV)[3]	Approval[4]	Range[5]	Condorcet methods[6]	Borda Count[7]
resistance to spoilers[8]	low[9]	medium[10]	high[11]	medium[12]	medium[13]	high[14]	low[15]
later-no-harm criterion[16]	yes[17]	yes[18]	yes[19]	no[20]	no[21]	no[22]	no[23]
resistance to strategic voting[24]	low[25]	high[26]	high[27]	low[28]	low[29]	high[30]	low[31]
majority-favorite criterion[32]	yes[33]	yes[34]	yes[35]	no[36]	no[37]	yes[38]	no[39]
mutual-majority criterion[40]	no[41]	no[42]	yes[43]	no[44]	no[45]	yes/no[46]	no[47]
prospects for U.S. adoption[48]	high[49]	high[50]	high[51]	medium[52]	low[53]	low[54]	low[55]
Condorcet-loser criterion[56]	no[57]	yes[58]	yes[59]	no[60]	no[61]	yes/no[62]	yes[63]
Condorcet-winner criterion[64]	no[65]	no[66]	no[67]	no[68]	no[69]	yes[70]	no[71]
independence of clones criterion[72]	no[73]	no[74]	yes[75]	yes/no[76]	yes/no[77]	yes/no[78]	no[79]
monotonicity criterion[80]	yes[81]	no[82]	no[83]	yes[84]	yes[85]	yes/no[86]	yes[87]

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[1] Plurality Voting is the most prevalent method of voting in the U.S. In a single seat election, the voter picks one candidate, and the candidate selected by the largest number of voters is elected, regardless of whether that candidate is favored by a majority or not. Because of its supposed similarity to a horse race this method is sometimes referred to as "First Past the Post" or FPTP.

[2] Two-round Runoffs are intended to prevent split majorities resulting in the election of a candidate that the majority opposes. The winner of the second round is considered a majority winner, although, due to drop-off in turnout, this "winner" could receive fewer votes in the runoff than the loser received in the first round. Thus the "majority" is manufactured by preventing voters from voting for eliminating candidates and discounting all voters who do not turn out for the second round.

[3] Instant Runoff Voting has several variants and other names, including "Ranked-Choice Voting (RCV), Preferential Voting, and the "Alternative Vote." Voters are allowed to rank candidates in order of choice using a single transferable vote. If no candidate is the first choice of a majority of voters, candidates are sequentially dropped from the bottom, with ballots that were credited towards these candidates then being credited to those voters' next choice who has not been eliminated. This simulation of a series of runoffs ends when one candidate receives a majority or only one candidate remains. This method of voting was invented in Massachusetts around 1870, based on the "single transferable vote" innovation developed some decades previously. It is described in Robert's Rules of Order (Robert, et al., 2000: 411-414), and is used for government elections in places such as the U.S., Ireland and Australia.

[4] Approval Voting allows voters to vote for as many candidates as they wish in a single-seat election, with the candidate receiving the most votes being elected. Thus some voters may cast one vote, while others effectively may cast several. Since this method is not used in government elections it has not been constitutionally tested as to whether it complies with the one-person, one-vote mandate.

[5] Range Voting asks each voter to assign a score (such a 0 - 10) to each candidate, with the candidate with the highest average score being elected. It is used in sporting events with impartial judges and Internet scoring of various products or services. Because this method is highly susceptible to strategy, it is most appropriate when voting is conducted by disinterested judges, rather than voters with a stake in the outcome.

[6] Named after the Marquis de Condorcet who invented it around the time of the French Revolution. Voters are asked to rank all candidates. There rankings can be used to do a pair-wise comparison of how each candidate would theoretically do in a head-to-head match up with each other candidate one at a time. If there is one candidate who would defeat each of the others in a one-on-one contest, this candidate is termed the "Condorcet winner." In some scenarios there is no such winner, as a cycle where A would beat B, B would beat C and C would beat A exists (think of rock, paper, scissors). In this case a variety of different procedures (often named for the inventor) have been proposed for settling which candidate should win.

[7] Borda Count, named after its inventor Jean-Charles de Borda around the time of the French revolution, asks voters to rank all candidates in order of preference. Based on this order, the candidates are assigned a score, with the first choice receiving the most points, the second choice receiving a smaller, number, etc. with the last candidate receiving no points. In one sense, it is like Range voting, except that the points are inflexibly tied to the ranking order, rather than set by the voters individually. Because it is highly susceptible to strategy, like Range Voting, it is most suitable for elections by impartial judges, rather than voters with a stake in the outcome.

[8] Resistance to Spoilers: A "spoiler" is a minor candidate with little chance of winning, that by being in the race, results in a candidate that the majority of voters oppose being elected over a candidate that a majority of voters would prefer.

[9] Elections with more than just two candidates are prone to spoiler situations under Plurality rules. In fact, the spoiler concern is raised in most campaigns with more than just two candidates in the U.S. The primary means by which plurality elections resist spoiler scenarios is by suppressing candidacies and restricting voter choice, or convincing voters to abandon their true favorite choice in favor of a "lesser evil."

[10] Two-round runoffs were originally implemented to avoid the spoiler scenario, and elect a majority winner, rather than a mere plurality candidate. Two-round runoffs can achieve this goal when the number of candidates is fairly limited. however, because two-round runoffs fail the clone resistance criterion, it is possible for a spoiler scenario to occur in the first round if there are more than three candidates (because it is actually a plurality election with two "winners" who advance), knocking out an otherwise winning candidate from the final runoff. For example: in an election with 100 voters and three candidates, A, B, and C.

32 voters prefer the candidates in the order A>C>B
30 voters prefer the candidates in the order B>C>A
38 voters prefer the candidates in the order C>B>A

Candidates A and C advance to the second round with 32 and 38 votes respectively. In the runoff round C wins 68 to 32. However if a fourth minor candidate (D) enters the race who appeals to the supporters of C such that the preferences are as follows:

32 voters prefer the candidates in the order A>C>B>D
30 voters prefer the candidates in the order B>C>D>A
29 voters prefer the candidates in the order C>D>B>A
9 voters prefer the candidates in the order D>C>B>A

Instead of advancing to the runoff round, candidate C is eliminated due to the entry of the "spoiler" candidate D, and candidates A and B advance to the runoff, which B wins 68 to 32.

[11] IRV is fully resistant to classic spoiler scenarios in which a minor candidate splits off votes from an otherwise winning candidate. However, IRV can still suffer a dynamic similar to the spoiler dynamic when there are three or more candidates with strong support. In such cases it may sometimes be possible that a voter's support for a favorite candidate rather than a "lesser-of-two-evils" candidate may result in the favorite making it to the final runoff instead of the compromise candidate, and yet the favorite candidate may be unable to win in that runoff against a less-preferred choice, whereas the compromise candidate could have won. There are no known examples of this scenario playing out in real world IRV elections, but it is at least conceivable.

[12] Approval voting is probably less prone to spoilers than plurality elections, but is not immune. A key fact to understand is that whether a voter "approves" (votes for) a particular candidate depends on what other candidates the voter has to compare the candidate to. Here is a spoiler scenario under Approval:

If the voter thinks candidate A is okay, and B is horrible in a two way race, the voter will likely approve A and not vote for B.

If there are 100 voters and 55 prefer A>B and 45 B>A, this two-way race could end with a total vote of 55 for A to 45 for B. Thus A is both the de facto majority choice as well as the Approval winner.

Now comes the spoiler...What if candidate C decides to run as well? It happens that a significant portion (let's say 25 out of the 55) of the former A supporters who care most about issue X view candidate C as a fantastically superior candidate to A or B (though they still prefer A over B as well). Some of these voters would feel the need to withdraw their approval of A so they can indicate how superior C is to A (and worry that maintaining a vote for A as well may help defeat their new favorite C), while others would continue to approve A and add an approval vote for C as well. If more than ten of these former A supporters decide to maximize the chance of electing C by withdrawing their approval from A, then B can win instead A=44, B=45, C=11. Thus C has "spoiled" the race for A. The entry of C caused B to go from a loser to a winner. Because Approval Voting violates the later-no-harm criterion many voters will simply "bullet vote" for their favorite, reproducing the same spoiler dynamics typical of plurality voting.

[13] In some scenarios Range may relieve the spoiler dynamic, but not in others. Here is a simple spoiler scenario under Range voting. A key fact to understands is that how a voter scores a particular candidate depends on what other candidates the voter has to compare the candidate to.

If the voter thinks candidate A is okay, and B is horrible in a two way race, the voter will likely score A as a 10 and B as a 0.

If there are 100 voters and 55 prefer A>B and 45 B>A, this two-way race could end with a total score of 550 for A (55 voters giving a 10 and 45 giving a 0) to 450 for B. Thus A is both the de facto majority choice as well as the Range score winner.

Now comes the spoiler...What if candidate C decides to run as well? It happens that a significant portion (let's say 25 out of the 55) of the former A supporters who care most about issue X view candidate C as a fantastically superior candidate to A or B (though they still prefer A over B as well). It seems likely that many of these voters would feel the need to reduce the score of ten they otherwise would give to A to make room on the scale so they can indicate how superior C is to A. These 25 voters might now score the candidates as follows, A=5, B=0, and C=10. In other words, the score that A now receives from some voters depends on whether C has entered the race. The B supporters who generally don't care much about issue X view C as just another version of A, so give this new candidate a 0 as well. Under this entirely plausible scenario, with C in the race, now the total scores might be: candidate A now only gets 425 (30 x 10 and 25 x 5), while B still gets 450 (45 x 10) and C gets 250 (25 x 10).

Thus C has "spoiled" the race for A. The entry of C caused B to go from a loser to a winner.

[14] Condorcet voting would be resistant to spoilers in most real-world elections. The spoiler problem could surface in close elections in which there was no true Condorcet winner (a candidate who would defeat all others in head to head comparisons.)

[15] Because Borda is not clone resistant and assigns fixed scores based on candidate ranking, it suffers the same propensity for spoilers that Range voting does, only more so. When voters rank a new minor candidate above their otherwise top choice that automatically reduces the chances of that otherwise top choice.

[16] Later No Harm Criterion: Indicating an lower choice on the ballot cannot hurt that voters first choice. This is important because methods that violate this criterion can prompt voters to refrain from expressing their full preferences, or "bullet voting" only for their favorite choice.

[17] The later-no-harm criterion is technically satisfied by plurality voting simply because voters are not allowed to indicate any later choice on the ballot.

[18] Two-round Runoffs could be said to comply with the later-no-harm criterion in that a voter is allowed to indicate a later choice in the second round of the election (if their favorite has been eliminated), and this cannot hurt the voter's first choice, as that candidate already has no chance of winning. In another sense, it could be argued that, as with plurality voting, the later-no-harm criterion does not apply to two-round runoffs in the normal sense, because voters are disallowed from indicating later preferences on their individual ballots.

Thus C has "spoiled" the race for A. The entry of C caused B to go from a loser to a winner.

[19] Because IRV uses the "single transferable vote," indicating a second choice can never hurt that voters first choice, and indicating a third choice can never hurt the first nor second choice, etc. The fact that IRV satisfies the later-no-harm criterion leads voters to honestly rank their choices in real world elections. This is not true of voting methods that fail the later-no-harm criterion, where real world experience (such as with Bucklin voting in Alabama in the 1930s) reveals widespread "bullet" voting. See Brewer (1993) and Burgin (1931).

[20] Example of Approval Voting failing the Later-No-Harm Criterion:
The criterion states that a voter's indicating a second or lower preference should not hurt the voter's top choice.

Scenario: 60% of voters think that candidate A is the absolute best choice, and that candidate C is horrible. They don't know much about B (B has avoided taking stands on any controversial issues), but believe almost anybody is better than C. 40% of voters like candidate C the best, and really hate candidate A. They don't know much about B, but believe almost anybody is better than A.

The A supporters cast their ballots for both A and B (they include B to help assure that C won't win in case A isn't strong enough to win). The C supporters vote for both C and B (to help assure that A won't win in case C isn't strong enough to win).

The outcome: A receives 60 votes, B receives 100 votes and C receives 40 votes. Candidate A loses, although an absolute majority of voters thought A was the best candidate. B wins, although not a single voter thought B was best.

Note that supporters of candidate A, by honestly indicating that they liked B better than C with their Approval Ballot, have thereby caused the defeat of their favorite candidate (A). Methods that fail this criterion promote "bullet" voting for only a first choice, that can devolve to straight plurality voting.

[21] Under Range voting, giving any score above a zero to a lesser preferred candidate may end up electing that candidate and defeating the voter's more preferred choice. Thus Range voting fails the Later-No-Harm Criterion.

[22] The Condorcet Criterion and the Later-No-Harm Criterion are fundamentally incompatible. However, there are numerous variations of Condorcet rules that vary on how to select a winner when there is no clear Condorcet winner. Some of these variants satisfy the Later-No-Harm Criterion and some of them don't. (see http://fc.antioch.edu/~james_green-armytage/vm/survey.htm#Condorcet Green-Armytage (n.d.)) The variant of Minimax Condorcet, for example, that uses pair-wise opposition to determine the winner does satisfy later no harm, but despite it generally being classified as a Condorcet method, it does not satisfy the Condorcet criterion, and is not strictly a “Condorcet” method.

[23] Under Borda Count, the ranking given to a less-preferred candidate may give that candidate just enough points to defeat that voters preferred choice. Thus, Borda fails the later-no-harm criterion.

[24] Resistance to Strategy: All voting methods can suffer from strategic manipulation by voters in some special circumstances. The measure here is how likely such strategic opportunities are likely to arise in real-world elections, and voters are likely to recognize and utilize such opportunities. These evaluations are based on two analyses. Firstly, the real-world election analysis by Prof. Nicolaus Tideman i (Tideman [2006]). Tideman did not examine all types of voter strategy, nor all types of possible election scenarios, however, his analysis is the most thorough that has been peer-reviewed and published. Another analysis that took a completely different approach, but came to the same basic conclusions was performed by James Green-Armytage's in his UC Santa Barbara PhD research paper at http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf (Green-Armytage [2008]).

[25] James Green-Armytage (2008) 's analysis http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf and Nicolaus Tideman (2006) found that plurality voting is frequently prone to strategic voting manipulation (Tideman score of 6.3, where 10 is fully resistant). An obvious strategy is to vote for one's second choice rather than first choice to avoid electing one's last choice.

[26] James Green-Armytage's analysis http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf(Green-Armytage [2008]) and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) found that two-round runoffs are highly resistant to strategic voting manipulation (Tideman score of 8.1, where 10 is fully resistant). One example of strategic manipulation is voting for the weakest opponent for one's true favorite in the first round, and then switching to your true favorite in the final election.

[27] James Green-Armytage's analysis http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf (Green-Armytage [2008]) and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) found that IRV is one of the most resistant of all voting methods to strategic voting manipulation (Tideman score of 9.7, where 10 is fully resistant), and the absolute most resistant of any voting method actually used in any government elections anywhere in the world. Theoretical opportunities for strategic voting due to non-monotonicity simply do not occur, or are so counter-intuitive that voters do not consider them.

[28] James Green-Armytage's analysis (Green-Armytage [2008]) http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) found that Approval voting is one of the absolute **most** prone to strategic voting manipulation of all voting methods (Tideman score of 3.9, where 10 is fully resistant). One obvious strategy is to suppress approvals of good candidates and approve only one's favorite candidate because additional approvals may serve to defeat one's first choice.

[29] James Green-Armytage's analysis (Green-Armytage [2008]) http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) found that Range voting is one of the absolute **most** prone to strategic voting manipulation of all voting methods (Tideman score of 4.0, where 10 is fully resistant). An obvious strategy is to score potential competitors extremely low regardless of true opinion, to avoid helping these candidates defeat one's favorite choice.

[30] James Green-Armytage's analysis (Green-Armytage [2008]) http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) that certain Condorcet methods are highly resistant to strategic voting manipulation (Tideman score of 8.9, where 10 is fully resistant). There are some newer variations on Condorcet voting, such as "Alternative Smith" that are even more resistant (scoring 9.9).

[31] James Green-Armytage's analysis (Green-Armytage [2008]) http://econ.ucsb.edu/graduate/PhDResearch/electionstrategy10b.pdf and Nicolaus Tideman's analysis in real world elections (Tideman [2006]) found that Borda voting is extremely prone to strategic voting manipulation (Tideman score of 4.6, where 10 is fully resistant). An obvious strategy is to rank the strongest competitor of one's true favorite artificially low to suppress that candidates total score.

[32] Majority Favorite Criterion: If a majority (more than 50%) of voters consider candidate A to be the best choice, then A should win.

[33] If there is a candidate who is the favorite choice of a majority of voters in a particular race, that candidate will win under plurality election. The only exception to this rule would be if some voters mistakenly believed this candidate might be a spoiler, and so insincerely vote for a candidate who is not their true first choice. Of course, in many elections with more than just two candidates there is no candidate that a majority favor over all others.

[34] Just as with plurality voting and IRV, if there is a candidate who is the first choice of a majority of voters, that candidate will win under two-round runoff rules, without even the need for a second round of voting.

[35] Just as with plurality voting and two-round runoffs, if there is a candidate who is the first choice of a majority of voters, that candidate will win under IRV rules, without even the need for a second round of counting.

[36] Example of Approval Voting failing the Majority Favorite Criterion.
The criterion states that if one candidate is the favorite choice of a majority of voters that candidate should always win.
Scenario: 60% of voters think that candidate A is the absolute best choice, and that candidate C is horrible. They don't know much about B (B has avoided taking stands on any controversial issues), but believe almost anybody is better than C. 40% of voters like candidate C the best, and really hate candidate A. They don't know much about B, but believe almost anybody is better than A.
The A supporters cast their ballots for both A and B (they include B to help assure that C won't win in case A isn't strong enough to win). The C supporters vote for both C and B (to help assure that A won't win in case C isn't strong enough to win).
The outcome: A receives 60 votes, B receives 100 votes and C receives 40 votes. Candidate A loses, although an absolute majority of voters thought A was the best candidate. B wins, although not a single voter thought B was best.
Because Approval Voting rewards candidates who avoid taking stands on issues that may alienate any voters, the quality of campaigns and public debate will decline in future elections as candidates seek to avoid revealing their policy intentions on controversial issues.

[37] Under Range Voting it is possible for a candidate that 80% of voters think is the best choice to be defeated by a candidate that only a minority favor. A fundamental precept of Range Voting is that the intensity of a minority of voters' opinions about candidates should be able to trump a majority of voters with a different, but less vehement opinion. Advocates refer to this concept as "Bayesian regret," a sort of averaging of overall society satisfaction with an election outcome. There are many scenarios in which Range can defeat the candidate that the majority of voters prefer. Take as an example the election of Lyndon Johnson over Barry Goldwater in 1964 by 61% to 39%. If Johnson supporters saw him as a flawed candidate and some gave him a 2 and Goldwater a zero, and all Johnson voters together averaged a lukewarm score of 6 out of 10 (while giving Goldwater a zero), but Goldwater supporters gave their candidate an enthusiastic 10, the 39% minority would triumph.

[38] If one candidate is the first choice of a majority of voters that candidate will also be the Condorcet winner by winning every one-on-one match up.

[39] A candidate who is the first choice of a majority of voters is not assured victory under Borda rules. If voters who rank this candidate first rank a strong competitor highly as well, but the supporters of the competitor rank this competitor first, but the majority-favorite candidate extremely low, the competitor could end up with more total points than the majority-favorite candidate. Because this strategy is readily apparent, Borda is excessively prone to strategic manipulation from insincere voting.

[40] Mutual majority criterion: If there is a single group of more than half of the voters who rank every candidate in a set over every candidate outside that set, then the winner should always be a member of the smallest such set. The relationship between this criterion and two other criteria that are also based on the principle of majority rule can be summarized as follows.

If a majority favorite candidate exists (see note 32 above), then any method that satisfies the mutual majority criterion should elect the majority favorite. This means that a method that can fail to elect a majority favorite necessarily fails the mutual majority criterion as well (approval, range, Borda). But the converse is not true; some methods that always select the majority favorite when there is one nonetheless fail to select a member of a mutual majority set when there isn't a single majority favorite (plurality, two-round runoff).

Elections can have a mutual majority but no Condorcet winner (see note 64 below). Conversely, elections can have a Condorcet winner but no mutual majority set of candidates. If an election has both a mutual majority set and a Condorcet winner, then the Condorcet winner is always a member of the mutual majority set. But some elections have one kind of majority without having the other, and some elections have neither. There are methods that satisfy one of these two criteria but not the other.

[41] Plurality voting fails the mutual majority criterion. For example: In a race with 100 voters and three candidates, if 45 voters prefer the candidates in the order A>B>C, 30 prefer them B>C>A, and 25 would rank them C>B>A, the smallest mutual majority set is {B, C}, because the 30 B>C>A voters and the 25 C>B>A voters rank the candidates B and C in that set above candidate A. In a plurality election, even though a majority of voters prefer either B or C over A, candidate A is elected with a mere plurality of votes.

[42] Two round runoffs cannot assure that one of the mutual majority candidates wins. In a race with a larger field of candidates, where candidates A and B are middle-of-the-pack compromise candidates who are favored by a majority of voters over any other single candidate, they may both be eliminated from the runoff election by two plurality leaders with strong core support (first preferences) but little broad support. Thus even though either A or B would win if they were included in the runoff election, neither is included.

[43] Unlike a two-round runoff, IRV's use of sequential elimination assures that split majorities, which might eliminate all mutual majority candidates from the final runoff under Two-round runoffs, can recombine so that a mutual majority candidate is assured of inclusion in the final runoff, and ultimate election.

[44] Approval voting does not satisfy the mutual majority criterion. For example, the presence of a widely despised candidate may prompt voters to draw their approval line rather low, "approving" candidates they would rank below their more preferred choices. If enough voters in the mutual majority group indicate approval for such a less preferred choice, who is not part of the set of mutual majority candidates, a candidate who is not part of the mutual majority set, who a majority of voters would rank below some other candidates, can be elected.

[45] Since Range voting does not satisfy the majority favorite criterion, it cannot satisfy the mutual majority criterion either.

[46] Among the numerous methods that are collectively called Condorcet methods because they satisfy the Condorcet winner criterion (see note 64 below), some also satisfy the mutual majority criterion and some do not. Hence the “yes/no” in this cell of the table.

[47] Like Approval and Range, the Borda count does not satisfy the mutual majority criterion because it does not satisfy the majority favorite criterion.

[48] Prospects for Adoption in the U.S for government elections: Only the plurality, two-round runoffs and IRV have ever actually been used in U.S. governmental elections. The remainder are sometimes called theoretical voting methods, as they have no track record in high-stakes government elections to evaluate how well they might work. The prospects for adopting untested theoretical methods is substantially less than for proven methods.

[49] Plurality is the most common method for elections in the U.S., though not used by most democracies.

[50] Two-round runoffs are widely used in the U.S. and although the trend is away from, rather than towards this method (due to concerns for increased costs, and reduced voter turn-out), a high visibility spoiler scenario could galvanize a community to support it.

[51] IRV has the advantage over other reforms in having the obvious analog of two-election runoffs with which voters are already familiar. IRV offers the benefits of two-election runoffs without the negatives, and with dozens of bills and charter amendments recently proposed, as well as a number of adoptions, IRV is the only reform with momentum. None of the other reforms listed in this chart have any adoptions, nor popular momentum, though some have active cadre of advocates on the Internet. IRV also benefits from the fact that it solves the spoiler problem that elected officials see as a problem (Democrats think of Nader and Republicans think of Perot or Libertarian Bob Barr), meaning those in power can be convinced to adopt it, even without the option of initiative and referendum.

[52] Approval voting is not currently used by any government in the world, but was briefly used in the former Soviet Union. Although there is currently no movement towards its adoption in the U.S. it does benefit from the fact that it does not face the obstacle of needing changes in voting machines or software. However, the fact that it violates the majority-favorite criterion (meaning a candidate that the majority of voters think is the best choice can lose under Approval) makes it unlikely that it will win adoption in the U.S.

[53] Most people (and certainly most elected officials) are unlikely to be willing to abandon the principle of majority rule in favor of Bayesian regret (the core concept of Range Voting). If 55% of voters prefer candidate A and 45% prefer candidate B in a two candidate race, Range Voting promotes the concept that perhaps B should win if the 45% feel very strongly about their choice, while the 55% are only lukewarm about their choice. This characteristic of Range Voting, the fact that it expressly rejects the notion of majority rule, means that it will never be adopted for government elections.

[54] The ballots used for Condorcet are identical to those used by IRV, so it shares similar voting machine challenges. However, Condorcet is significantly more complicated to explain. Unlike the other methods compared in this chart, Condorcet voting is uniquely infeasible to count by hand. However, if IRV or another ranked voting method is adopted first, and voting machines that are fully compatible with ranked ballots become commonplace, these barriers to adoption of Condorcet will be mitigated.

[55] The fact that Borda is so highly prone to strategic manipulation means that it is unlikely to receive consideration for high-stakes government elections in the U.S.

[56] Condorcet Loser Criterion: If a particular candidate would lose in a one-on-one match up against each of the other candidates in a race, then this candidate should lose. A method that fails this criterion can elect a candidate that most would agree is simply the "wrong" one. Note that this criterion is used rather than the Condorcet Winner Criterion because it is more universally accepted. Some election method experts question the importance of the Condorcet Winner Criterion because a Condorcet winner may have no first preferences and be a relatively unknown candidate who benefits from an "anybody but…" situation. In some scenarios most voters would likely feel a Condorcet candidate was not a rightful winner. However, very few people would dispute the criterion that insists a candidate who would lose every single one-on-one match-up should lose.

[57] Polarizing candidates with core support but without broad support are often elected under plurality elections, but are defeated under methods that satisfy the Condorcet Loser Criterion. For example: An election with 100 voters and three candidates, A, B, and C.

32 voters prefer the candidates in the order A>B>C
30 voters prefer the candidates in the order B>A>C
38 voters prefer the candidates in the order C>A>B

A would defeat C 62 to 38, and B would defeat C 62 to 38, so C is the Condorcet loser. However when voters are limited to a single choice, as under Plurality voting, C wins with the most votes, 38, over A's 32 and B's 30.

[58] A candidate who is the Condorcet loser, but with substantial core support can make it into the runoff round, but is assured of losing in that one-on-one match up.

[59] As with a two-round runoff, it is possible for a candidate who is the Condorcet loser, but with substantial core support to make it into the final runoff round of counting, but at that point such a candidate is assured of losing in that one-on-one match up.

[60] It is possible for a candidate who would lose every one-on-one match up to win under Approval voting. For example, An election with 100 voters and three candidates, A, B, and C.

32 voters prefer the candidates in the order A>>B>C (the double >> indicates a huge difference)
30 voters prefer the candidates in the order B>>A>C
38 voters prefer the candidates in the order C>>A>B

In this scenario all groups of voters have an incentive to "bullet vote" for their favorite choice allowing C to win with a plurality of 38 over 32 and 30 for the other candidates respectively, although C is the Condorcet loser who would lose to either A or B alone by 38 to 62.

[61] It is possible for a candidate who would lose every one-on-one match up to win under Range voting. One candidate could be given a top score by a substantial minority, and ranked above the bottom by most of the remaining voters who may favor other candidates, but are seeking to block a candidate each of them considers to be even worse. Here's an example: A and B are moderate candidates with C and D being polarizing candidates at two extremes of the political spectrum. With 100 voters

26 prefer the candidates in the order A>B>D>C,
24 prefer them in the order B>A>D>C,
36 prefer them in the order C>A>B>D, and
14 prefer them in the order D>A>B>C.

A, B and D supporters (64) would vote for any of A, B, or D over C in a head-to-head race against C, so C is the Condorcet loser (and A is the Condorcet winner). Now applying Range scores, since A supporters may see B as a rival that may defeat A, they may choose to rank B significantly lower so that B does not nose ahead of A (let's say they give a score of 2 on average). Likewise for B supporters who may rank A low, though they both give C a zero. If C voters score C at the top (10) and A, B and D at the bottom (0). The final total score could be something like A=336, B=334, C=360, and D=240, with C getting the highest Range score and being elected.

[62] In cases where there is a Condorcet winner, Condorcet voting methods will not elect the Condorcet loser. However, in situations where there is no Condorcet winner (i.e. there is a top level loop such as A beats B, B beats C and C beats A) some methods, such as MinMax, may elect the Condorcet loser.

[63] Borda is recognized by experts as satisfying the Condorcet loser criterion (see http://fc.antioch.edu/~james_green-armytage/vm/survey.htm#borda Green-Armytage [n.d.]), though I have not come across a proof of this.

[64] Condorcet Winner Criterion: If a particular candidate would win in a one-on-one match up against each of the other candidates in a race, even if nobody considers that candidate to be the best choice, then this candidate should win. Methods that satisfy this criterion may favor compromise candidates as well as little-known and inoffensive candidates.

[65] A candidate who would defeat each of the other candidates in a head-to-head race is not assured victory under Plurality rules. For example: An election with 100 voters and three candidates, A, B, and C.

32 voters prefer the candidates in the order A>B>C
30 voters prefer the candidates in the order B>A>C
38 voters prefer the candidates in the order C>A>B

A would defeat B 70 to 30, and A would defeat C 62 to 38, so A is the Condorcet winner. However when voters are limited to a single choice, as under Plurality voting, C wins with the most votes, 38, over A's 32 and B's 30.

[66] Two-Round Runoffs will generally elect a Condorcet winner, but this is not assured. For example: In a race with several candidates, a compromise (or inoffensive) candidate who would win every pair-wise match up against more polarizing candidates, may not have enough votes (or even ANY votes) in the first round of the runoff and thus be eliminated prior to the final runoff election.

[67] IRV will generally elect a Condorcet winner, but this is not assured. For example: In a race with several candidates, a compromise (or inoffensive) candidate who would win every pair-wise match up against more polarizing candidates, may not have enough first rankings (or even ANY at all) in an early round of the IRV tally and thus be eliminated prior to the final runoff count. Ironically, IRV may actually do a better job of electing Condorcet winners that nominal Condorcet voting methods, because of the incentives for strategic voting under Condorcet rules that are absent under IRV. see Reason #3 in essay by Greg Dennis here http://www.gregdennis.com/voting/irv_vs_condorcet.html

[68] Depending on how voters establish their approval cut-offs, a Condorcet winner may, or may not, win under Approval voting. Because Approval does not satisfy the later-no-harm criterion, many voters may restrict their approval to their single favorite candidate to avoid risking this candidate's defeat with additional approvals for competitors. In such a scenario Approval essentially degenerates to straight plurality voting, in which Condorcet winners can easily be defeated. Even without universal "bullet" voting, if the Condorcet winner is merely an inoffensive middle candidate in a field with a relatively large number of more polarizing candidates, the Condorcet winner may get very few approval votes, and fail to win.

[69] Just as with Approval voting, if voters make a sharp distinction between their most preferred choices and a compromise or inoffensive Condorcet winner who is in the middle, the total Range score for the Condorcet winner can easily be below that of highly favored candidates. In the example in the note explaining Range voting's failure of the Condorcet loser criterion, candidate A is the Condorcet winner, but is defeated by the Condorcet loser, candidate C.

[70] Condorcet voting is designed specifically to find and elect a Condorcet winner whenever such a candidate exists. Ironically, due to incentives for strategic voting inherent in Condorcet methods, they may in fact fail to elect the Condorcet winner, even when one exists. see Reason #3 in essay by Greg Dennis here http://www.gregdennis.com/voting/irv_vs_condorcet.html

[71] Even without any strategic manipulation (to which Borda is extremely susceptible), Borda can fail to elect the Condorcet winner. For example: Using a typical linear point system where the last ranked candidate gets zero points and each higher ranked candidates gets one additional point with the top ranked candidate getting one fewer points than there are candidates, imagine five candidates (A, B, C, D and E) and 100 voters.

40 voters prefer the candidate in the order A>E>B>C>D
24 voters prefer the candidate in the order B>A>C>D>E
20 voters prefer the candidate in the order C>B>A>D>E
16 voters prefer the candidate in the order D>B>A>C>E

B is the Condorcet winner (beating A 60 to 40, beating C 80 to 20, beating D 84 to 16, and beating E 60 to 40). But A wins under Borda rules with 304 total points, to B's 284, C's 184, D's 108 and E's 120.

[72] Independence of Clones Criterion: "Clones" means a set of candidates such that no ballots rank a non-member of the set in between two members of the set or equal to any member of the set. "Independence of clones" means that if a clone set has two or more members, removing one of the clones should not have any bearing on whether the winning candidate comes from the set. Likewise, adding a new clone to the set should not have any bearing on whether the winning candidate comes from the set.

[73] If one recognizes that voters may have preference orders for candidates, but that Plurality voting only counts each voter's first choice, the addition of a new candidate who appeals to some of the same voters as the otherwise winner can split the majority with some voters first choice going to one clone, and some to another, resulting in the election of a different candidate who loses relatively fewer voters to the new "clone" candidate.

[74] While less vulnerable to clones than Plurality voting, Two-Round Runoffs still fails this criterion. In a race with four or more candidates, two clones may split their support, causing neither to advance to the second round, although either of the clones would have won over the other candidate had either clone candidate advanced to the runoff round.

[75] IRV satisfies the independence of clones criterion because the majority that gets split by a clone re-combines through the single transferable ballot in the stack of the strongest of the clone candidates.

[76] Approval satisfies the independence of clones criterion so long as voters simply add clones to their approval list, rather than strategically limit themselves to one favored candidate. However, in polarized races where voters see a huge difference between their preferred choice and the pack, since Approval can degrade to vote-for-one plurality voting, which fails this criterion, so can Approval. Nagel (2007) analyzes early presidential elections under Approval Voting when clones are present. (for more details see http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1065909) There is no guarantee that voters will simply add clones to their approval list – they may approve only of the clone they prefer slightly better than the others.

[77] There is disagreement among experts on whether Range Voting complies with this criterion. Since Range Voting can degrade to Approval when voters seek to maximize their voting power by using top and bottom rankings exclusively, and Approval voting in turn can degrade to vote-for-one Plurality voting, Range may not satisfy this criterion. Tideman (2006) argues that if clones are re-defined to reflect the domain of Range Voting, it complies, while James Green-Armytage (n.d.) lists this criterion as one of those that Range Voting fails. (see http://fc.antioch.edu/~james_green-armytage/vm/survey.htm#cardinal)

[78] There are numerous variations of Condorcet rules that vary on how to select a winner when there is no clear Condorcet winner. Some of these variants satisfy the Clone Independence Criterion and some of them don't. (See http://fc.antioch.edu/~james_green-armytage/vm/survey.htm#Condorcet Green-Armytage [n.d.])

[79] Because the insertion or deletion of a clone in a list of candidates effectively changes the scores of all of the candidates ranked after that clone on every ballot, the addition or removal of a clone from a race can alter which candidate has the highest total point score, and thus fails the Independence of Clones Criterion.

[80] Monotonicity Criterion: It can be defined as follows: If the ranking of a winning candidate is raised on some ballots, this should not allow that otherwise winning candidate to become a loser. Although many voting experts dismiss this criterion as having little significance, it is included here because advocates of some voting methods stress the fact that IRV can fail this criterion.

[81] If a voter were to switch his/her vote to a different candidate, only the previously winning candidate, or this newly elevated candidate can win, which satisfies the monotonicity criterion.

[82] Both two-election runoffs and IRV can fail the monotonicity criterion because voters who shift to this otherwise winning candidate may shift their votes away from the candidate who would otherwise be in the runoff, resulting in a different, and stronger opponent in the final runoff, who may defeat the otherwise winner. Many election experts dismiss this criterion as having no real world impact (for more details see www.fairvote.org/monotonicity, and Austen-Smith and Banks [1998]).

[83] Both two-election runoffs and IRV can fail the monotonicity criterion because voters who shift to this otherwise winning candidate may shift their votes away from the candidate who would otherwise be in the runoff, resulting in a different, and stronger opponent in the final runoff, who may defeat the otherwise winner. Many election experts dismiss this criterion as having no real world impact (for more details see www.fairvote.org/monotonicity, and Austen-Smith and Banks [1998]).

[84] Raising a candidate from disapproved to approved can never hurt the elevated candidate under Approval voting.

[85] Raising the score for a candidate can never hurt that candidate under Range voting.

[86] Since no candidates are "eliminated" under typical Condorcet rules, raising the ranking of a candidate won't hurt that candidate. However, due to cycle resolution rules, Dodgson, Nanson, weighted Condorcet, alternative Schwartz, alternative Smith and Cardinal pairwise all fail the monotonicity criterion.

[87] Raising the ranking of a candidate can never hurt that candidate in a Borda Count election.