Reducing Manipulability
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# Criteria for Voting Systems

<table>
<thead>
<tr>
<th>Set of Voting Systems</th>
<th>Informed Majority Coalition Criterion (InfMC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veto…</td>
<td>A majority may choose the outcome when they know the other votes.</td>
</tr>
<tr>
<td>Borda…</td>
<td>Ignorant Majority Coalition Criterion (IgnMC)</td>
</tr>
<tr>
<td>Range Voting, Approval, Coombs…</td>
<td>A majority may choose the outcome.</td>
</tr>
<tr>
<td>Plurality, Two-round, IRV, Bucklin…</td>
<td>Majority Favorite Criterion (MF)</td>
</tr>
<tr>
<td>Baldwin, Dodgson, Kemeny, Maximin, Nanson, Schulze, Tideman…</td>
<td>Elects a candidate when she is preferred by a majority.</td>
</tr>
<tr>
<td>CondorcetCriterion (Cond)</td>
<td>Elects the Condorcet winner when there is one.</td>
</tr>
</tbody>
</table>

## Goal: Minimize the Manipulability Rate

\[ \rho(f) = P(\text{voting system } f \text{ is manipulable}) \]

## Transformations

- **Initial Voting System** \( f \)
- **Condorcification of** \( f \)
  - Elects Condorcet winner when she exists.
  - Otherwise, same outcome as \( f \).
- **Best Slice of** \( f^c \)
  - Depends only on orders of preference.
  - Meets the Condorcet criterion.

## Condorcification Theorem

If \( f \) meets InfMC:

\[ \rho(f^c) \leq \rho(f). \]

## Slicing Theorem

If voters are independent:

\[ \rho(f^{cs}) \leq \rho(f^c). \]

## Consequences

To minimize manipulability while keeping InfMC, one may restrict to voting systems that:

- Depend only on orders of preference,
- And meet the Condorcet criterion.