Reducing Manipulability
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To cite this version:
François Durand, Fabien Mathieu, Ludovic Noirie. Reducing Manipulability. Fifth International Workshop on Computational Social Choice (ComSoC - 14), Jun 2014, Pittsburgh, United States. 2014, <http://www.cs.cmu.edu/ arielpro/comsoc-14/index.html>. <hal-01095992>

HAL Id: hal-01095992
https://hal.archives-ouvertes.fr/hal-01095992
Submitted on 16 Dec 2014

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## Criteria for Voting Systems

<table>
<thead>
<tr>
<th>Veto…</th>
<th>Set of voting systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borda…</td>
<td>Informed majority coalition criterion (<strong>InfMC</strong>)</td>
</tr>
<tr>
<td>Range voting, Approval, Coombs…</td>
<td>Ignorant majority coalition criterion (<strong>IgnMC</strong>)</td>
</tr>
<tr>
<td>Plurality, Two-round, IRV, Bucklin…</td>
<td>Majority favorite criterion (<strong>MF</strong>)</td>
</tr>
<tr>
<td>Baldwin, Dodgson, Kemeny, Maximin, Nanson, Schulze, Tideman…</td>
<td>Condorcet criterion (<strong>Cond</strong>)</td>
</tr>
</tbody>
</table>

**InfMC:** A majority may choose the outcome when they know the other votes.

**IgnMC:** A majority may choose the outcome.

**MF:** Elects a candidate when she is preferred by a majority.

**Cond:** Elects the Condorcet winner when there is one.

## Goal: Minimize the Manipulability Rate

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

## 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 Thm.

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.