

Separating and Collapsing Electoral Control Types

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What Is an Electoral Control Type?

- A form of electoral attack where an election chair seeks to alter the election's structure so as to modify the outcome (i.e., the set of winners).
- There are 44 standard control types.
- Control types: adding/deleting candidates/voters and partitioning of candidates/voters.
- E.g., Plurality-DC-PC-TP-UW or Approval-CC-AC-NUW.

What Are Separations and Collapses?

- As is standard, we view control problems as decisions problems.
- Two control types collapse if the associated sets are the same. Otherwise, they separate.
- The separations and collapses may depend on the election system.

Our Work

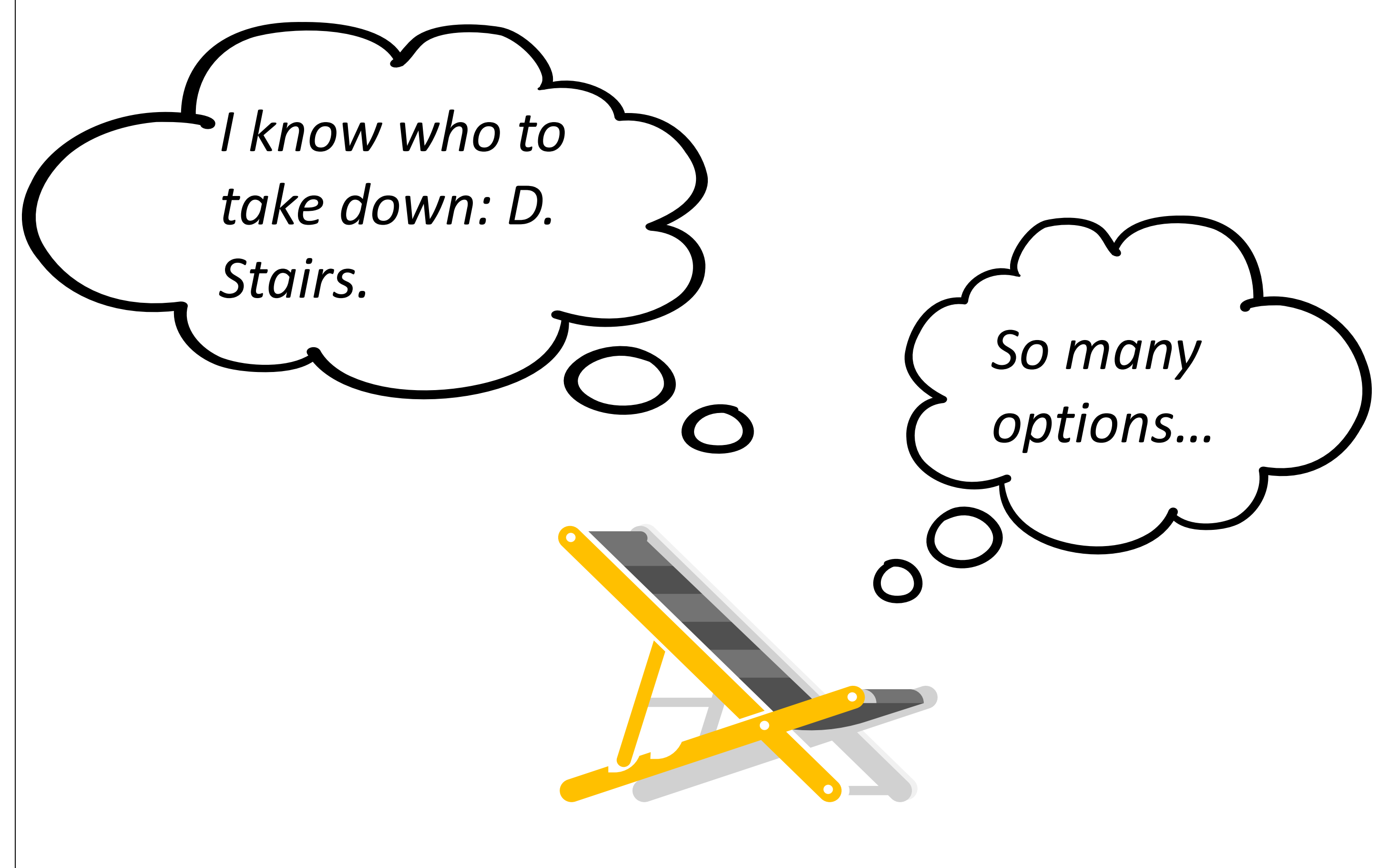
- Fully determines which standard control types collapse or separate in the general case, and for plurality, veto, and approval.
- Discovers 15 new concrete collapsing pairs!
- Involves an axiomatic approach: if the election system satisfies Property Unique- α , then 5 new pairs collapse.
- Uses computer-aided search for certain separations.
- Obtains refined separations: determines strict containments & various forms of incomparability.

Summary of Results

Election System	Collapses	Strict Containments	Incomparability	Open
General	7	38	277	0
Plurality	7	38	277	0
Veto	7+1	58	256	0
Approval	7+14	88	213	0

Key
Prior work
Our work

Lounger: The Control Chair



Lounger vs. Evil Lounger: They can never agree on which type is better.



Future Work and Open Directions

- Establish whether (decision-)collapsing pairs also search-collapse (now explored in a different paper by the same authors).
- Fully determine collapses and separations for additional election systems.
- Study the collapses induced by other axioms.
- Fully characterize collapses using axioms.
- Further refine separations beyond containment and incomparability, e.g., "Show that every incomparability is 'strong'."