

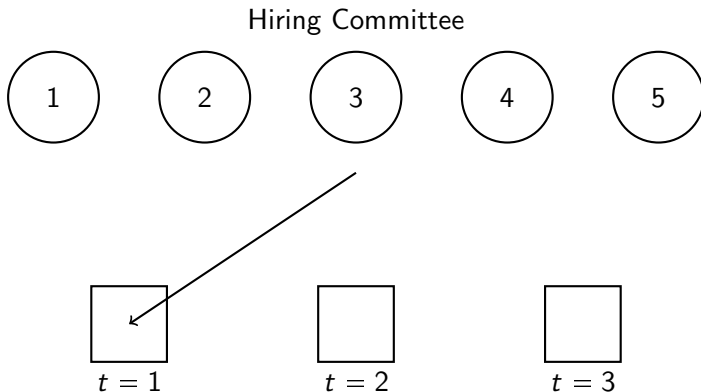
Design of Committee Search

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October 23, 2017

Story - Part 1

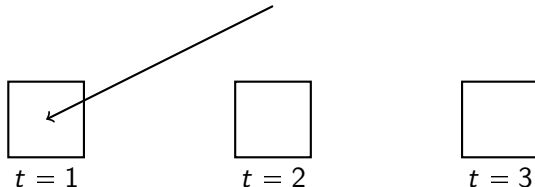
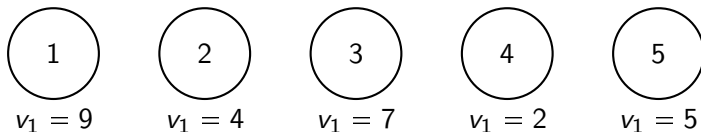
- A hiring committee plans to hire one candidate.
- Candidates present job market papers sequentially.



Story - Part 2

- Committee members have different preferences, possibly correlated.
- For example, every member rates a candidate from 1 to 10.

Hiring Committee



Candidates

Story - Part 3

- Once a candidate is accepted, search stops.
- Once a candidate is rejected, that candidate is gone (hopefully finds another job).

Hiring Committee



$$v_2 = 4$$



$$v_2 = 6$$



$$v_2 = 5$$



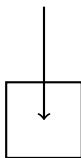
$$v_2 = 7$$



$$v_2 = 5$$



$$t = 1$$



$$t = 2$$



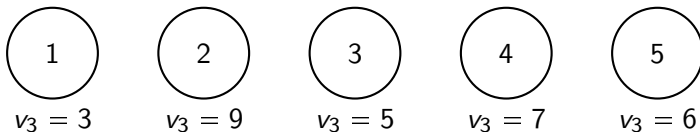
$$t = 3$$

Candidates

Story - Part 4

- Hiring a candidate affects all members.
- No monetary transfer is allowed.

Hiring Committee

 $t = 1$  $t = 2$  $t = 3$

Candidates

Key features

- Sequential decision
- Irreversible decision
- Private value
- Public good
- Without transfers

Mechanism

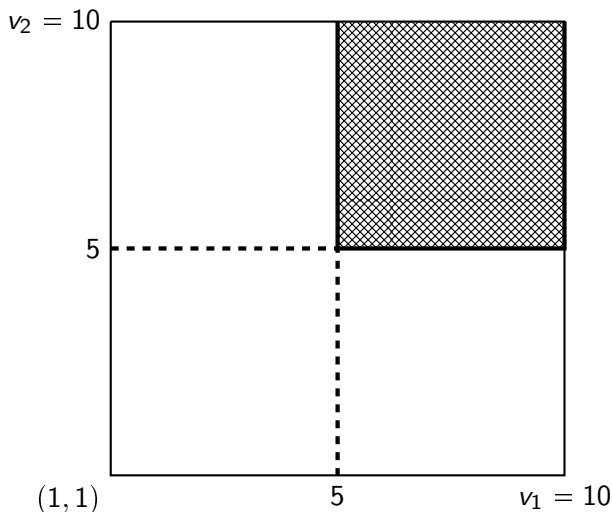
- A mechanism specifies, given any $v_t = (v_{t,1}, v_{t,2}, v_{t,3}, v_{t,4}, v_{t,5})$, either
 - 1 Hire, or,
 - 2 Move on to $t + 1$.

Question

- What is a mechanism that is
 - 1 Incentive Compatible?
 - 2 Pareto Optimal?

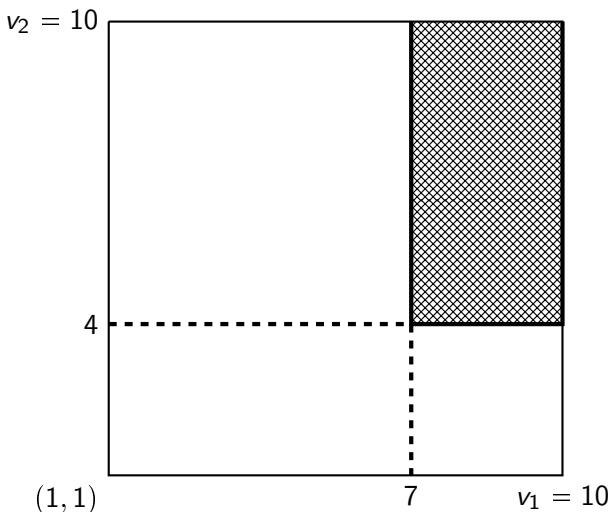
Incentive Compatible Example 1.1

- Unanimity: hire if both professors like the candidate



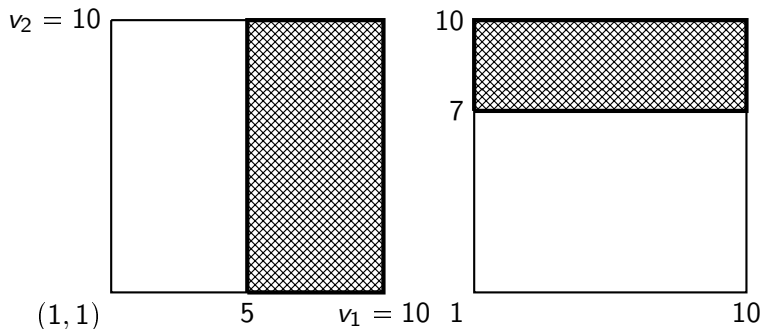
Incentive Compatible Example 1.2

- Unanimity: more or less picky professors



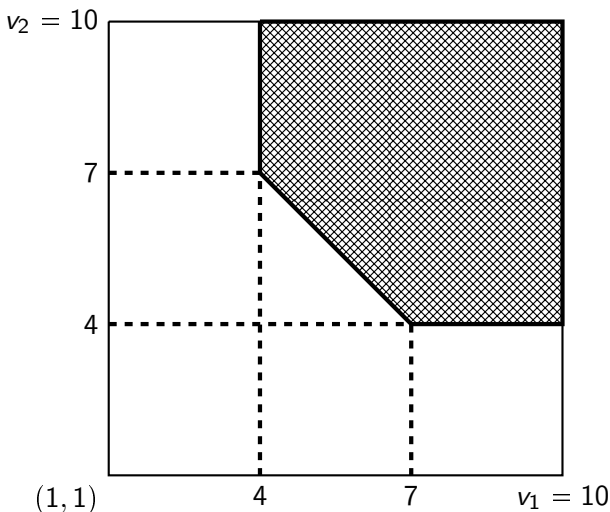
Incentive Compatible Example 2.1

- Dictator: professor 1 decides (left) or professor 2 decides (right)



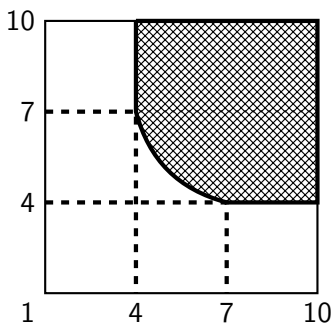
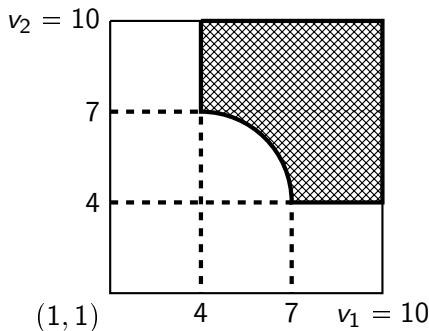
Incentive Compatible Example 3

- Additive: hire if sum of ratings $>$ some threshold



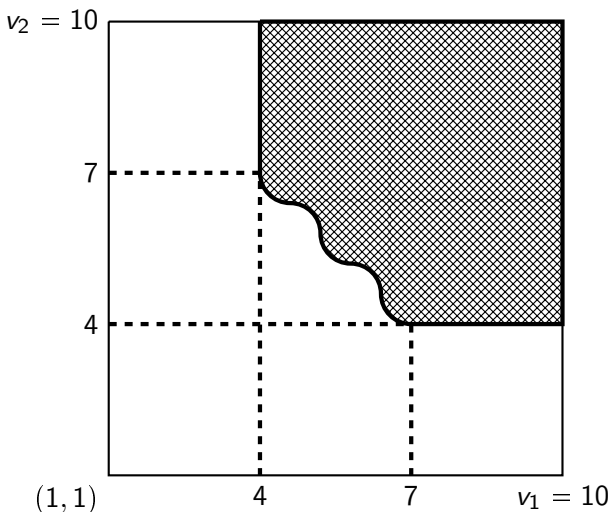
Incentive Compatible Example 4.1

- Other shapes: $v_1^2 + v_2^2 \geq \theta$ or $\log(v_1) + \log(v_2) \geq \theta$



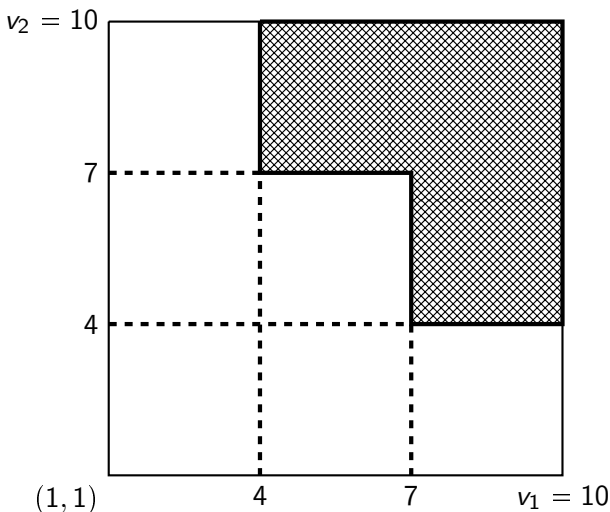
Incentive Compatible Example 4.2

- Other shape: ???



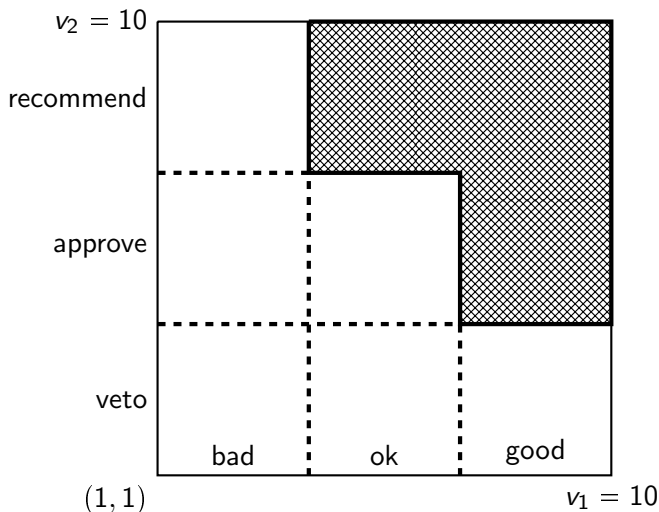
Incentive Compatible Example 5

- Optimal: hire if no one hates and at least one loves



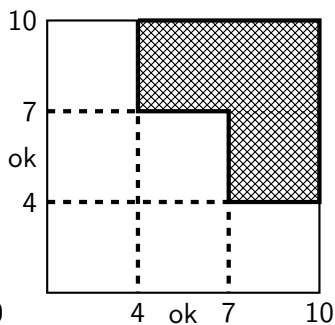
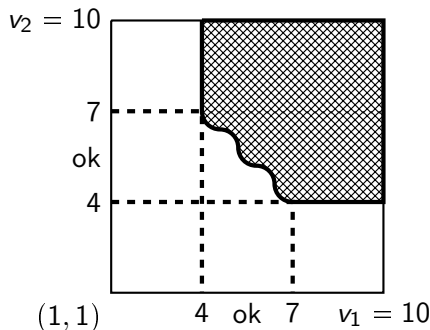
Optimal Mechanism - Ternary

- Two thresholds, three regions: veto, approve, recommend



Optimal Mechanism - Comparison

- If both professors approve, never hire $>$ sometimes hire.



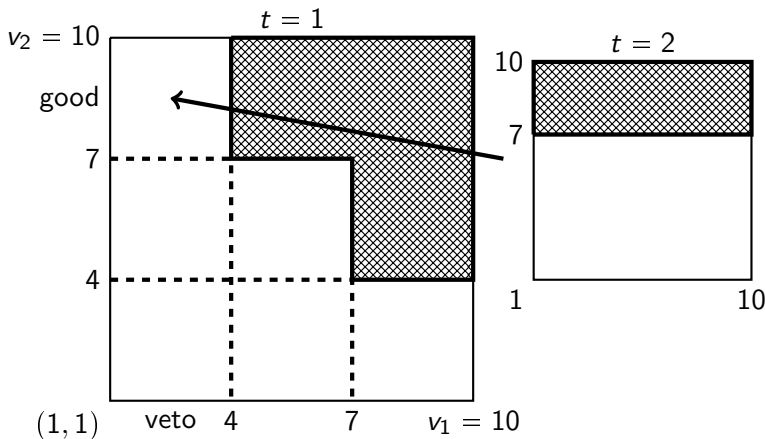
Main Result 1

Observation

If everyone thinks some person is okay, then that person is not okay.

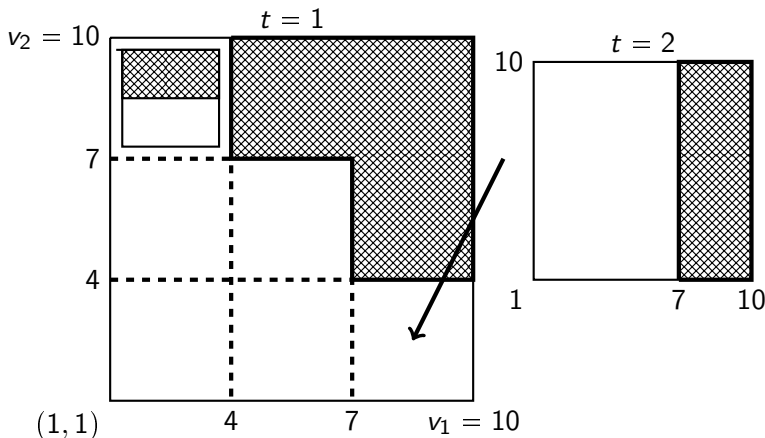
Optimal Mechanism - Linking Decisions 1.1

- After professor 1 vetos, she loses all voting power next period.



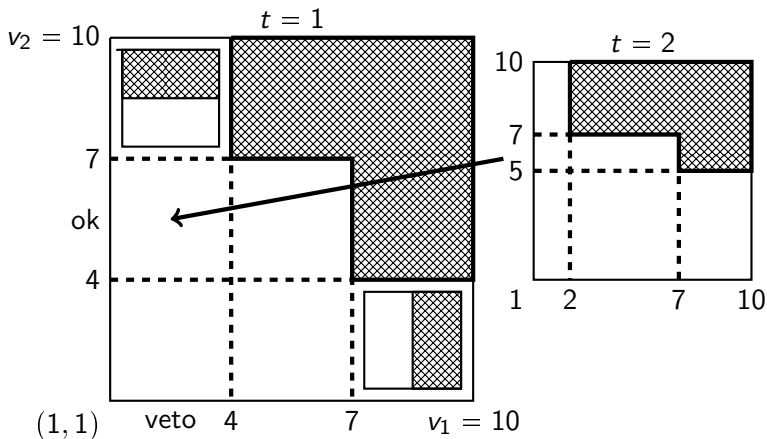
Optimal Mechanism - Linking Decisions 1.2

- After professor 2 vetos, he loses all voting power next period.



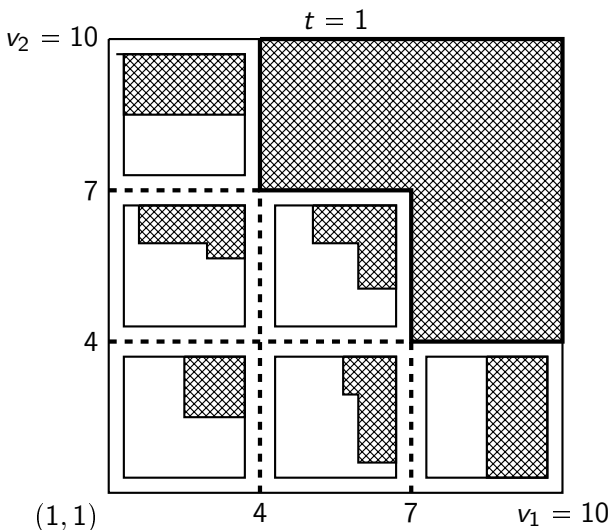
Optimal Mechanism - Linking Decisions 2

- A professor loses some voting power if the other approves.



Optimal Mechanism - Linking Decisions 4

- Many continuation rules are possible when they both veto.



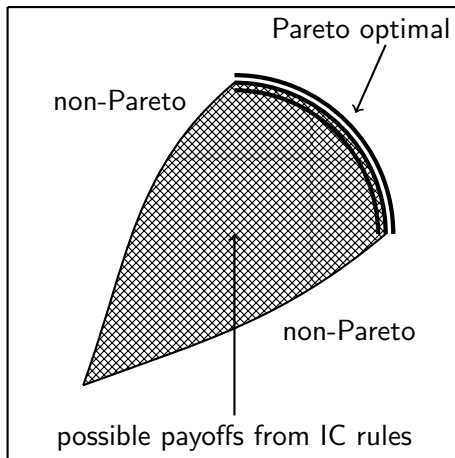
Main Result 2

Observation

If people complain too much, don't trust them.

Main Theorem

- Pareto optimal rules are ternary.
- Worst rules for each agent are also ternary.



Main Result stated in the paper

Theorem

Every incentive compatible mechanism can be constructed by randomization among ternary rules.

Thank You