Boolean Combinations of Weighted Voting Games

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Introduction

Basic Notions

- Based on *Boolean Combinations of Weighted Voting Games paper* ***BWVG***[1]
- It is a natural Generalization over **Weighted Voting Games**
- Intuitively is a decision making process via multiple committees
- Each committee has the authority to decide the outcome *"yes" or "no"* about an issue.
- And each committee is a WVG
- Individuals can appear in multiple committees
- Different committees can have different Threshold values

[1] Piotr Faliszewski, Edith Elkind, and Michael Wooldridge. 2009. Boolean combinations of weighted voting games. In Proceedings of The 8th International Conference on Autonomous Agents and Multiagent Systems - Volume 1 (AAMAS '09). International Foundation for Autonomous Agents and Multiagent Systems, Richland, SC, 185–192.

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Questions to be answered?

- Which coalitions might be able to bring the goal about?
- How important is a particular individual with respect to the achievement of the goal?

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Goals of the Paper

- Formal Definition of **BWVG**
- Investigate Computational Properties of **BWVG**

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Preliminary Definitions

Propositional Logic

- Let $\Phi = \{p, q, \dots\}$ be a fixed non-empty vocabulary of Boolean variables
- Let $\mathcal{L}$ denote the set of formulas of propositional logic over Φ
- If "$\vee$" and "$\wedge$" are the only operators appearing in formula φ, se say that φ is **monotone**
- If $\xi \subseteq \Phi$, we write $\xi \models \varphi$ mean that φ is true satisfied by valuation ξ

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Boolean Weighted Voting Games

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Shapley Value

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The Core

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Thank you!!