

A User's Theory

How to Model Agents of Online Debates

Hilmar Schadrack, M.Sc., Computer Science Department, HHU

Motivation

Cooperation

Users tend to cooperate in debates instead of staying alone.

How are these coalitions formed and when are they stable?

Power

User's arguments are differently convincing.

How can we measure the importance or strength of different statements?

Knowledge

Users usually don't have all information available.

How do we handle incomplete knowledge?

Mathematics

Formal models are often stiff and undynamic.

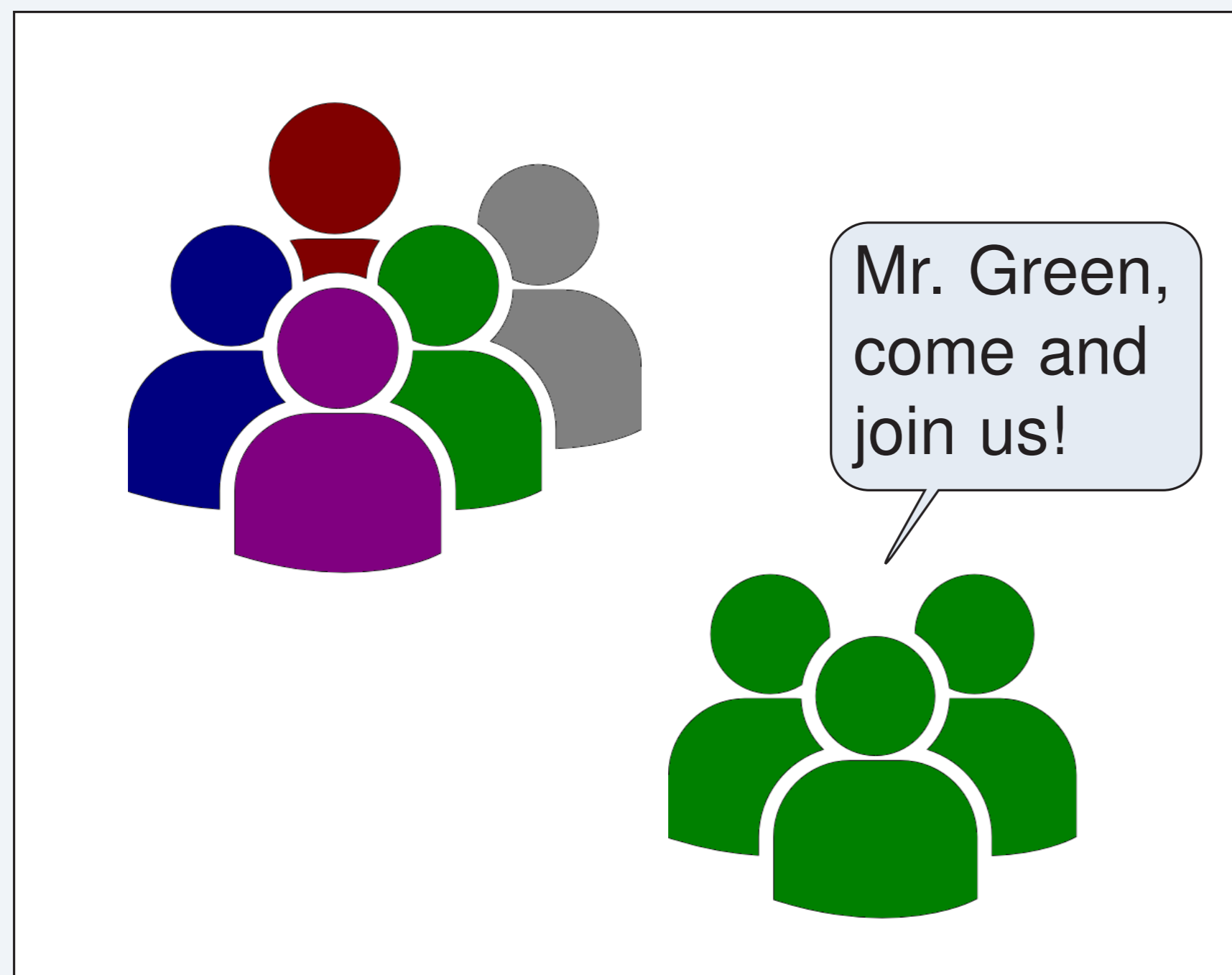
How can we mathematically model the dynamics and varying nature of debates?

My Thesis

Leading Question:

How can we mathematically model and analyze main aspects of participants of online debates?

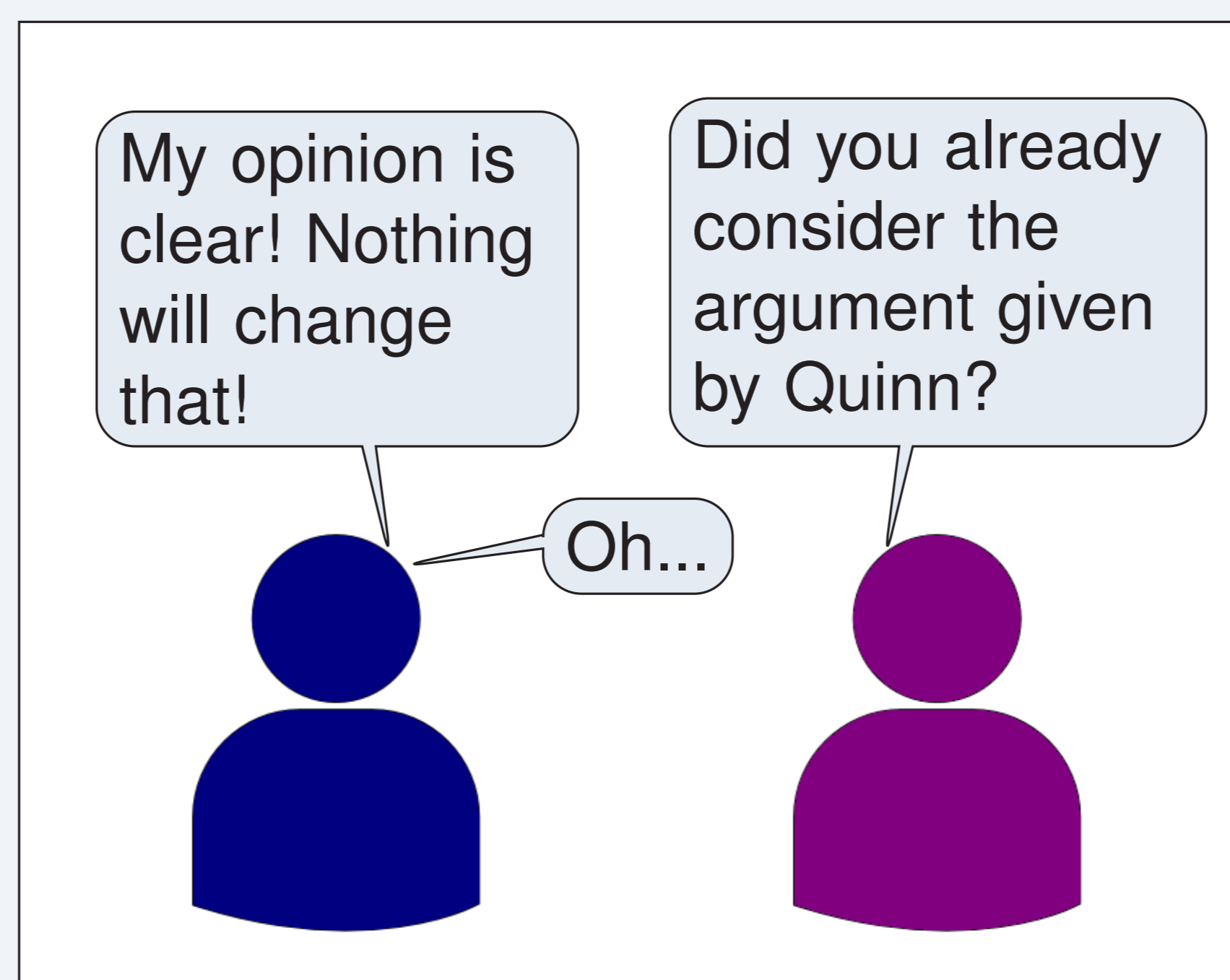
Approach



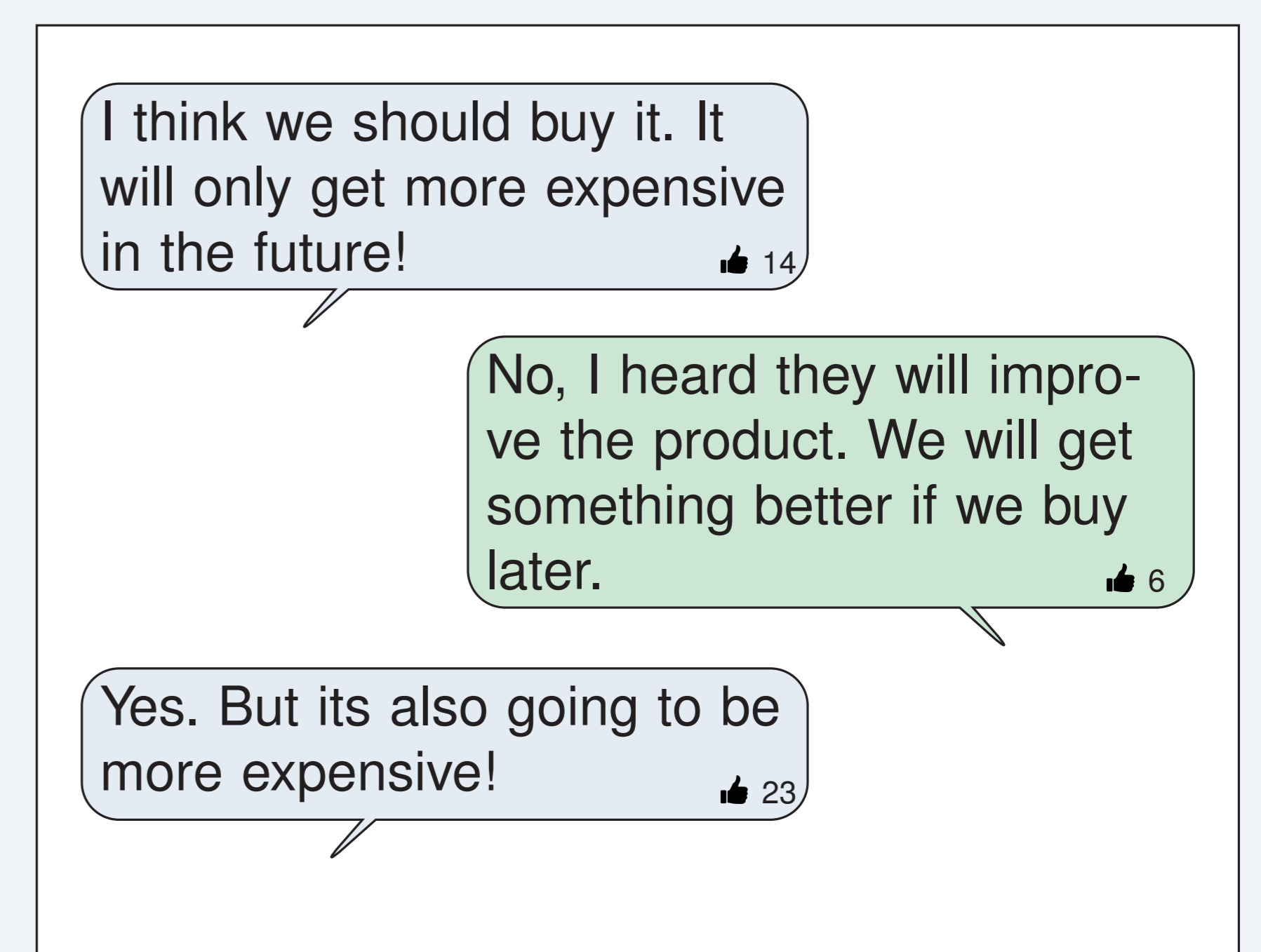
Sometimes stable **teams** cannot be found. We aim to determine the key factors of when this is possible, and how hard this might be.

List of publications (inc.):

- A. Rey, J. Rothe, H. Schadrack, L. Schend Toward the complexity of the existence of wonderfully stable partitions and strictly core stable coalition structures in enemy-oriented hedonic games. *Annals of mathematics and artificial intelligence*. Volume 77. Issue 3-4. Pages 317–333. August 2016.
- J. Lang, A. Rey, J. Rothe, H. Schadrack, L. Schend Representing and Solving Hedonic Games with Ordinal Preferences and Thresholds. *Proceedings of the 14th International Conference on Autonomous Agents and Multiagent Systems*. Pages 1229–1237. IFAAMAS. May 2015.
- D. Baumeister, D. Neugebauer, H. Schadrack und J. Rothe. Complexity of Verification in Incomplete Argumentation Frameworks. *Proceedings of the 32nd AAAI Conference on Artificial Intelligence*. To appear. AAAI Press. February 2018.



Information is key! We aim to predict the validity of arguments even without complete information over the arguments and interactions between them.



Measuring **agreement** is one way to find strong arguments. We aim to measure strength only regarding the structure of the discussion.

Inter- and transdisciplinarity

We use **methods** from *mathematics*, *computer science* und *logic*, but also measure our results with the help of *philosophic* criteria.

Our results are of interest for researchers from Computational Social Choice and Argumentation Theory, and therefore find their **applicati-on** in *social sciences*, among others.

Our **goals** are directly motivated through *practical computer science*, and therefore indirectly by *all parts* of the graduate school.

Supervision team

- Jun.-Prof. Dr. Dorothea Baumeister (Computer Science, HHU)
- Prof. Dr. Gregor Betz (Philosophy, KIT)
- Prof. Dr. Jörg Rothe (Computer Science, HHU)
- Rouven Brües (Liquid Democracy e.V.)