

Algorithmic game theory

Martin Balko

7th lecture

November 18th 2020



Other notions of equilibria

How did we end up here?

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.
- Thus we want to relax the notion of NE so that we still have an interesting solution concept, which is additionally computationally tractable.

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.
- Thus we want to relax the notion of NE so that we still have an interesting solution concept, which is additionally computationally tractable.
- First attempt: ϵ -Nash equilibria (ϵ -NE).

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.
- Thus we want to relax the notion of NE so that we still have an interesting solution concept, which is additionally computationally tractable.
- First attempt: ϵ -Nash equilibria (ϵ -NE).
- Though ϵ -NE look natural at first sight, there are some drawbacks.

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.
- Thus we want to relax the notion of NE so that we still have an interesting solution concept, which is additionally computationally tractable.
- First attempt: ϵ -Nash equilibria (ϵ -NE).
- Though ϵ -NE look natural at first sight, there are some drawbacks.
- For example, we know only quasi-polynomial algorithm to find ϵ -NE.

How did we end up here?

- We learned that computing NE is computationally intractable, unless $PPAD \subseteq P$.
- Thus we want to relax the notion of NE so that we still have an interesting solution concept, which is additionally computationally tractable.
- First attempt: ϵ -Nash equilibria (ϵ -NE).
- Though ϵ -NE look natural at first sight, there are some drawbacks.
- For example, we know only quasi-polynomial algorithm to find ϵ -NE.
- Today we will see a new solution concept that can be found efficiently.

Correlated equilibria



- The concept of correlated equilibria was introduced by **Robert Aumann**, who received a **Nobel prize** in economics for his work in game theory.



Figure: **Robert Aumann** (born 1930).

Sources: <https://en.wikipedia.org> and <https://slideslive.com/38910863/strategic-information-theory>

- The concept of correlated equilibria was introduced by **Robert Aumann**, who received a **Nobel prize** in economics for his work in game theory.



Figure: **Robert Aumann** (born 1930).

Sources: <https://en.wikipedia.org> and <https://slideslive.com/38910863/strategic-information-theory>

- In 2018, Robert Aumann visited Prague and gave a lecture at Prague mathematical colloquium. You can see the lecture here: <https://slideslive.com/38910863/strategic-information-theory>.

- The concept of correlated equilibria was introduced by **Robert Aumann**, who received a **Nobel prize** in economics for his work in game theory.



Figure: **Robert Aumann** (born 1930).

Sources: <https://en.wikipedia.org> and <https://slideslive.com/38910863/strategic-information-theory>

- In 2018, Robert Aumann visited Prague and gave a lecture at Prague mathematical colloquium. You can see the lecture here: <https://slideslive.com/38910863/strategic-information-theory>.

Thank you for your attention.