Game Theory for political scientists

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- Public policy and political science
- Social sciences and behavioural sciences
- People and governments, theory and practice, life and reason
- How are all these things compatible?

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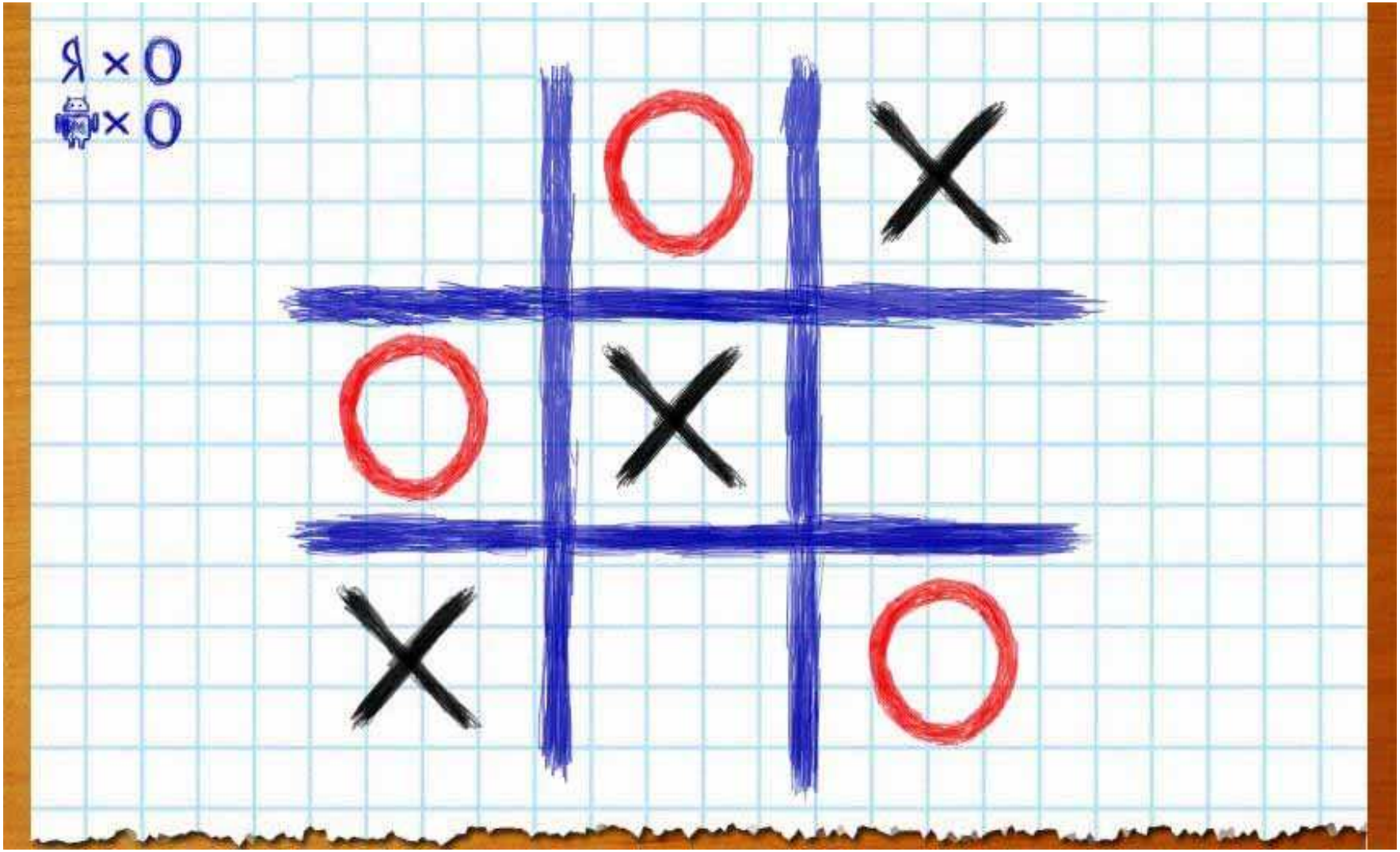

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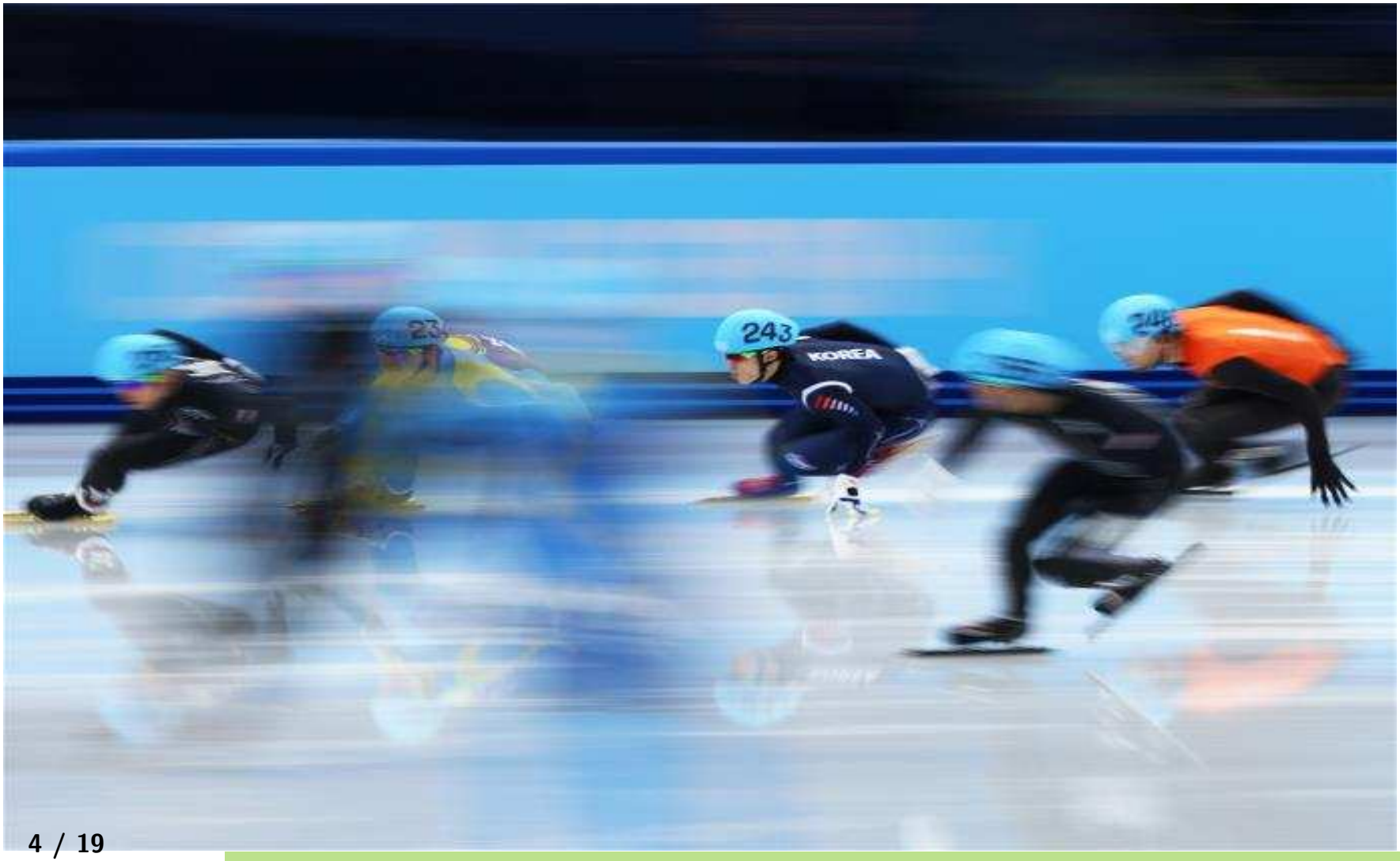

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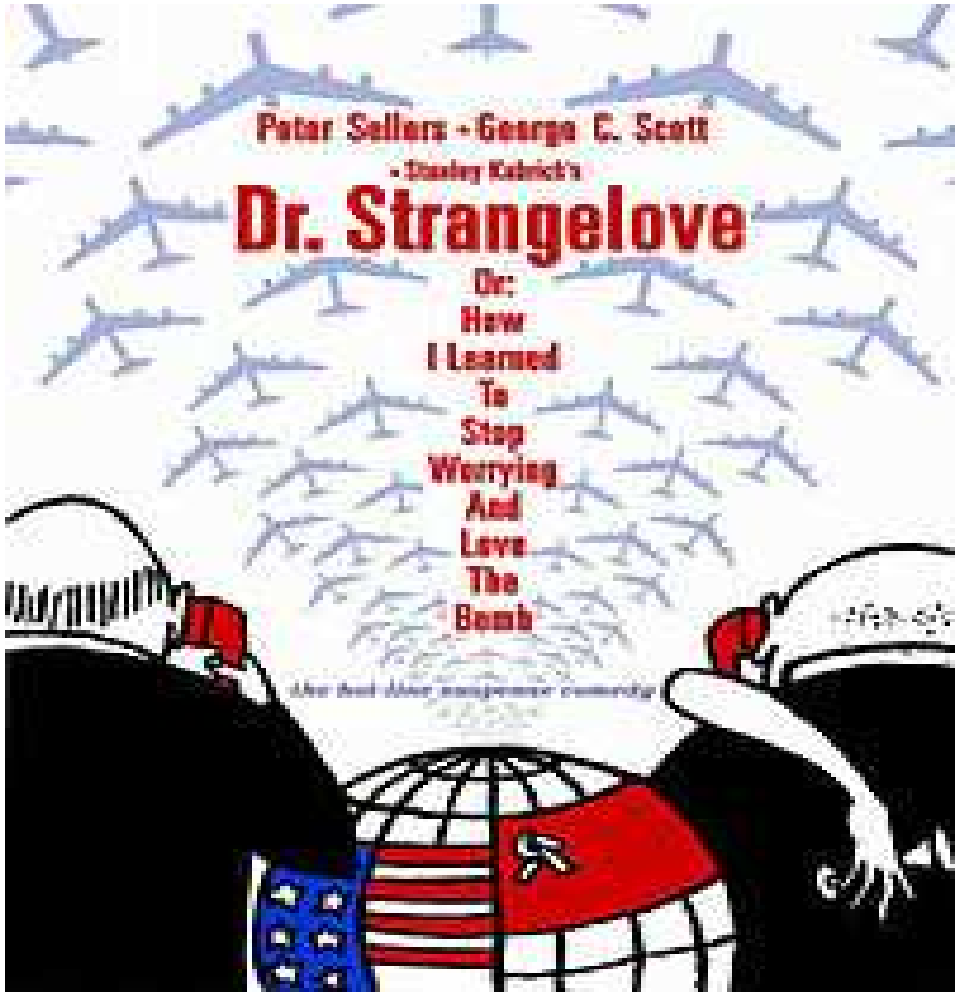

Figure:

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So, what is a game, after all?

- Interaction

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- That is, those who always strive to get as much as they can
- and who, consequently, try to get as much as they can from this interaction, given the behaviour of their opponents they can observe, rationalize and predict.

Rationality in economics

- Individuals can order the objects of choice X by preferences, i.e. can always say which of the objects they like more, and which one — less.
  - We impose no limits on the ordering of elements of X, nor on the strengths of preferences over them: all that matters is their rank
- In formal terms, rationality means that people typically choose the option which is highest in their subjective order, i.e. does not lose any chance to improve own well-being.
- This setup can have two interpretations
  - Normative: use this rule as instrument to make good decision
  - Positive: model behaviour of a typical individual who may not reason as supposed by the model, but behave as if he does reason in that way (Friedman 1953).

A prototype decision problem

If there is more than one possible outcome, **decision problem** is the task of choosing one *action* a of many possible actions from the set A which, given individiual *preferences* $\mathcal{P}$ over possible *outcomes* X, yields the most desirable of these given the circumstances caputred by the *state of the world* S:

$$a^* = \arg\max_{a \in A} X(a, S) | \mathcal{P} \tag{1}$$

The decision problem

	s_1	s_2	$\dots$	s_n
a_1	x_{11}	x_{12}	$\dots$	x_{1n}
a_2	x_{21}	x_{22}	$\dots$	x_{2n}
$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\vdots$
a_k	x_{k1}	x_{k2}	$\dots$	x_{kn}

or, more explicitly,

$$\begin{bmatrix} a_1 \\ a_2 \\ \vdots \\ a_k \end{bmatrix} \begin{bmatrix} s_1 & s_2 & \dots & s_n \end{bmatrix} \rightarrow \begin{bmatrix} x_{11} & x_{12} & \dots & x_{1n} \\ x_{21} & x_{22} & \dots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{k1} & x_{k2} & \dots & x_{kn} \end{bmatrix}$$

Example

Suppose the set X consists of outcomes:
'healthy' $\succ$ 'unhealthy' $\succ$ 'asthma' $\succ$ 'lung cancer',
with preferences decreasing in that order.

Suppose the set S consists of $\{$ 'predisp(osition to asthma/cancer)' and 'no predisp(osition to asthma/cancer)' $\}$, and

the set A consists of $\{$ 'smoking' and 'no smoking' $\}$.

A prototype decision problem

	predisposed	no predisposition
smoking	lung cancer	unhealthy
no smoking	asthma	healthy

$$\begin{bmatrix} \text{smoking} \\ \text{no smoking} \end{bmatrix} \begin{bmatrix} \text{predisp} & \text{no predisp} \end{bmatrix} \rightarrow \begin{bmatrix} \text{lung cancer} & \text{unhealthy} \\ \text{asthma} & \text{healthy} \end{bmatrix}$$

Decision to smoke is irrational as strictly dominated by 'no smoking'; yet it may be rational given 1) your preferences, and 2) the context.

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- In other words, ratioinal decisions are simply *best* decisions given person's preferences and constraints.
- Economists assume that *almost all* decisions are rational.
- Contrary to what one may think, rationality does not necessarily mean money maximization.
- Yet it applies to *almost every* human decision.

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- Broadly speaking, game theory studies any kind human interactions wherein people's decisions mutually affect opportunities, preferences and/or beliefs of each other.
- In most cases, behaviour is assumed to be *rational* and *strategic*.
- Two major classes of games: *noncooperative* and *cooperative*.

Ransom (1996)

Figure:
http://www.americanrhetoric.com/MovieSpeeches/moviespeechransom.html

Course information

- 10 lectures/seminars of 40 contact hours
- Timing: Wednesdays or Mondays?
- Home assignments (2-3).
- Homework (reading! (in English!!)).
- Classwork: discussion and experiments.
- Final exam.

Tentative syllabus

1. Rational behaviour and utility theory under certainty, risk and uncertainty.
2. Decisions and games
3. Static and dynamic games with politics applications.
4. Cooperative games.
5. Matching and mechanism design.

Suggestions and feedback: welcomed by all communication means (ICEF office 3427, icef-research@hse.ru)