

# January 2023 review

## Literature Review

### 1. Game Theory: Analysis of Conflict by Roger B. Myerson

- so far read 7/10 chapters
- different models for games (extensive, strategic, Bayesian), solution concepts (Nash equilibrium, sequential equilibrium, correlated equilibrium), repeated games

### 2. Sabin Roman's PhD thesis: Dynamic and game theoretic modelling of societal growth, structure and collapse

- system dynamics models of Easter island and Classic Mayan civilisations
- games on networks: finding the topology that optimises the average rationality of actors

### 3. Did not read The Rise and Fall of Civilisations by Nicholas Hagger

- according to many reviews, focuses heavily on religion which the author refers to as “Light”
- instead: Steven Pinker's “The Better Angels of our Nature”, which explores the causes for violence between humans and the decline in violence

### 4. Technosignatures

# Research Question

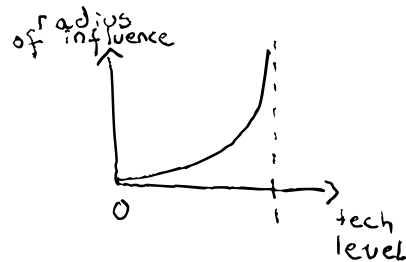
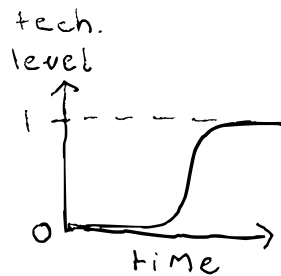
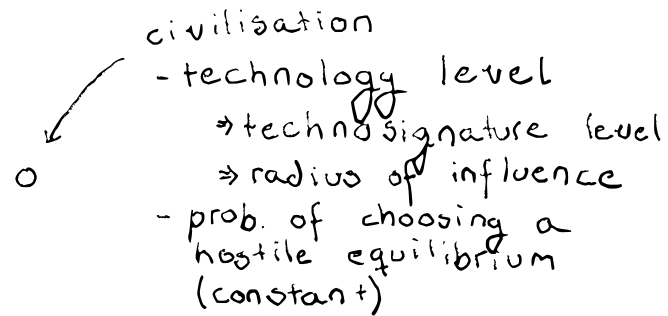
How do civilisations act towards each other to ensure their survival?

Operationalised as:

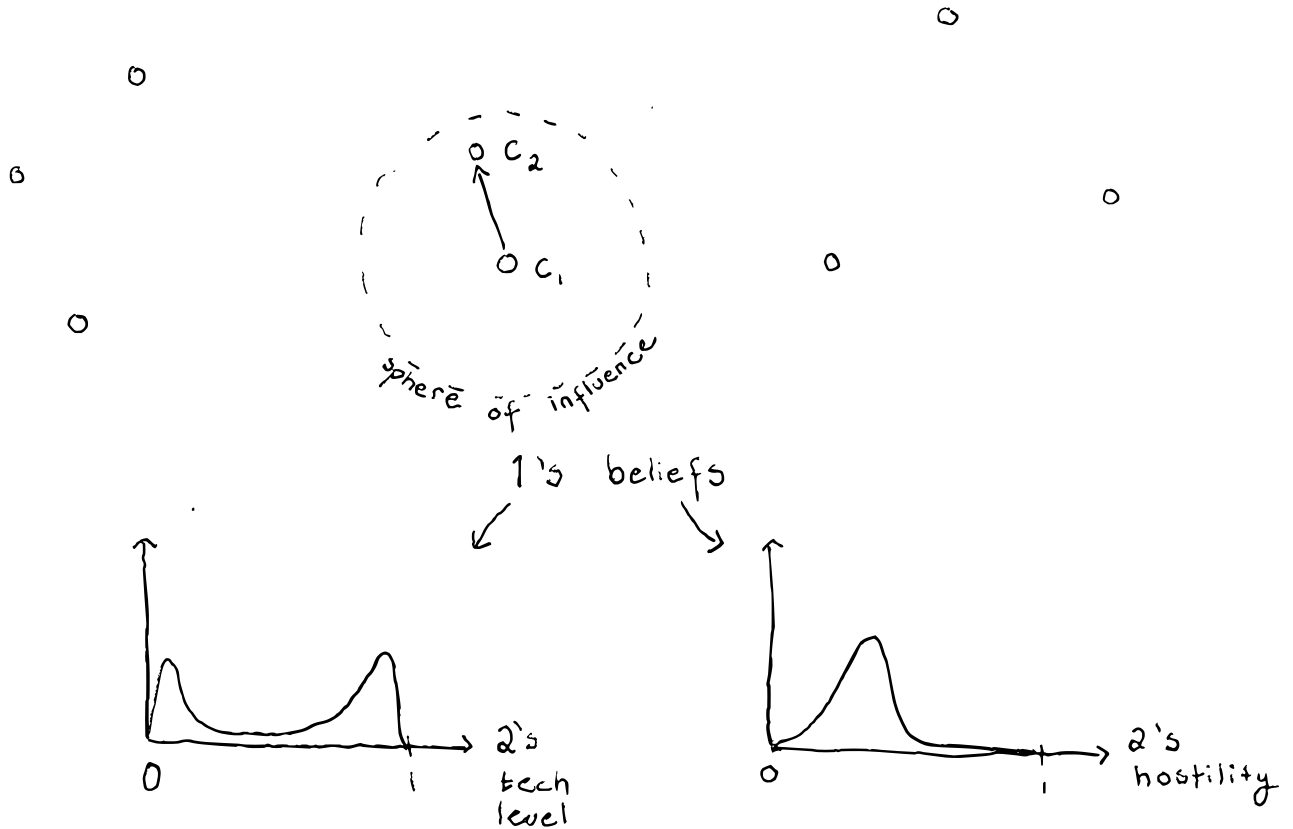
In a model with repeated games between rational players who

- are connected in a network and
  - have different tendencies to be hostile,
- which agents survive?

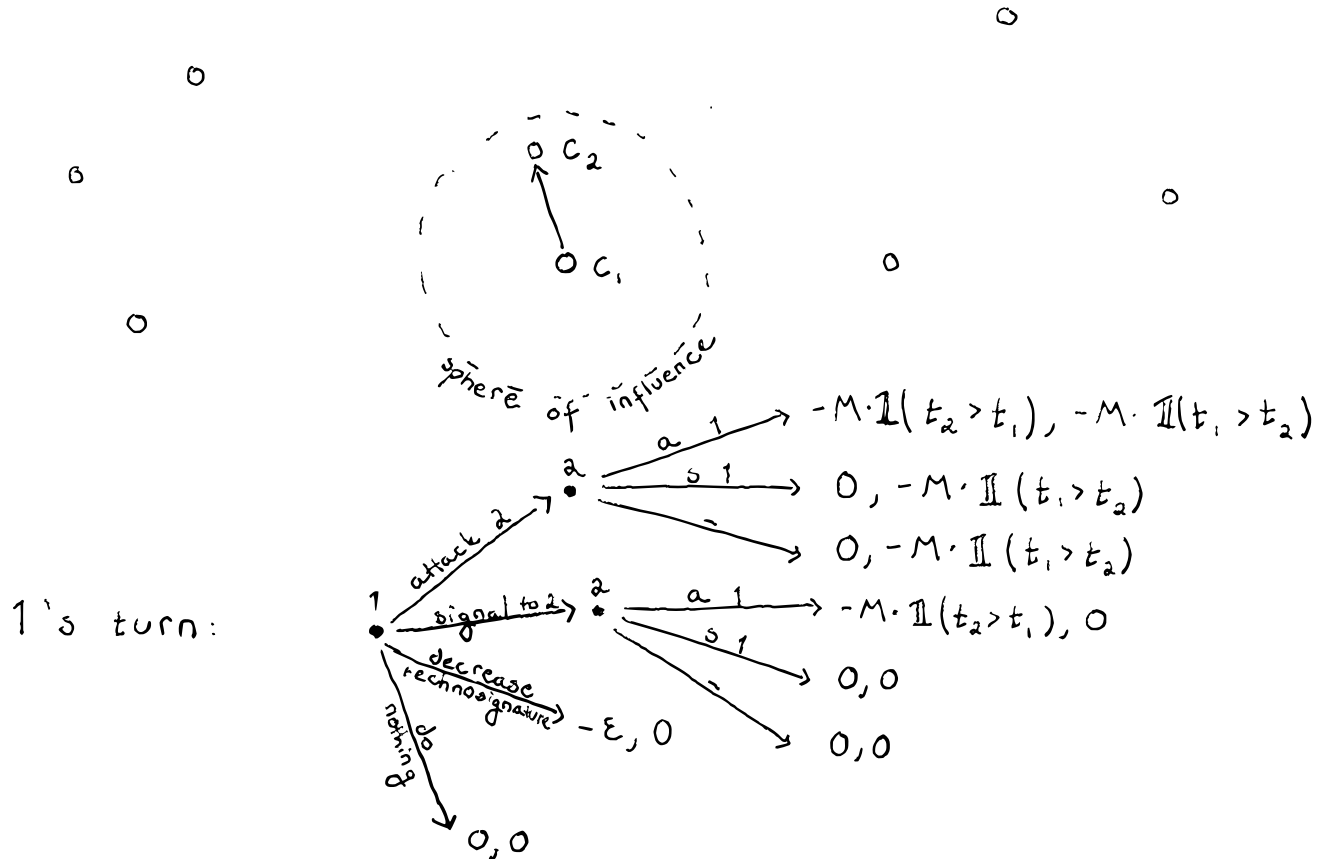
# Sketch of Model



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## Sketch of Model

sequence of interactions involving  $c_i$

$(c_i) \dots (c_j \rightarrow c_i) \dots (c_k \rightarrow c_i) \dots (c_i) \dots$  actual (unpredictable)

$(c_i) (\alpha_1) \dots (\alpha_m)$

hypothesised by  $c_i$  to  
decide what to do

# Next Steps

- more literature review on games on networks
- ?