

# Exercise 2

R Programming

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URPP Social Networks



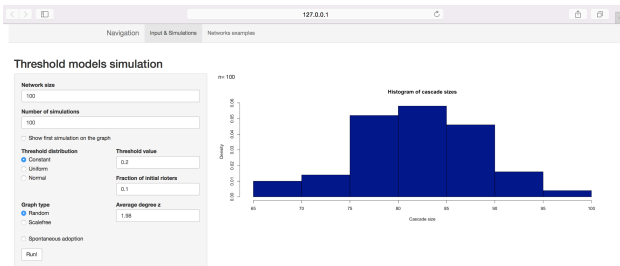
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# Material

3

- Models, you can use:
  - Threshold.
  - Dissemination of culture.
  - Tribute model.



If you want to use it, then

- Open R
- Run the following commands:
  - `library(shiny)`
  - `runUrl("https://github.com/abelgabel/threshold_models/archive/master.tar.gz")`
- Other models:
  - `runUrl("https://github.com/abelgabel/tribute_game/archive/master.tar.gz")`
  - `runUrl("https://github.com/abelgabel/dissemination_of_culture/archive/master.tar.gz")`

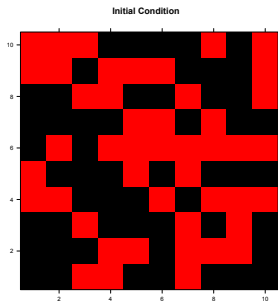
# Problems:

5

1. Create a set of agents living in a two dimensional lattice.
2. Each agent has an opinion  $(-1,1)$ : randomise initial opinions.
3. At each period of time, choose an agent at random (A).
4. Select one of its neighbours (B).
5. If they have different opinion, then with probability  $\frac{1}{2}$  agent A switches its opinion to the one agent B has.
6. If they share the same opinion, there is no updating of opinions.

# Parameters

- Size of the lattice:  $10 \times 10$ .
- Number of period 1000.
- Do agents reach a consensus? What if you decrease the size of the lattice, e.g.  $5 \times 5$ ?



# Simulations

7

[Click video](#)

## Hints for point 1-3

- Define a matrix (agents0)
  - First column represents agents' opinion.
  - Second and third columns represent agent position in the lattice, (x-axis, y-axis).
- Choose an agent at random.
  - Use function sample().



## Hints for point 4 and 5

9

- Select a neighbour
  - Use function `abs()` and compare coordinates.
- Compare elements with `<=`, `==` and `>=`

What does the command `agent0[agent0[,1]==1,]` do?

How would you change the command to use it in point 4?

# Plot agents opinion

10

- install package "lattice".
- 
- Use the function: `levelplot()`.

- Simulate 1000 periods
- Plot each period that is equal to 1 modulus 100.

- [https://github.com/abelgabel/voter\\_model](https://github.com/abelgabel/voter_model)

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