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# Using SVM to determine critical temperature

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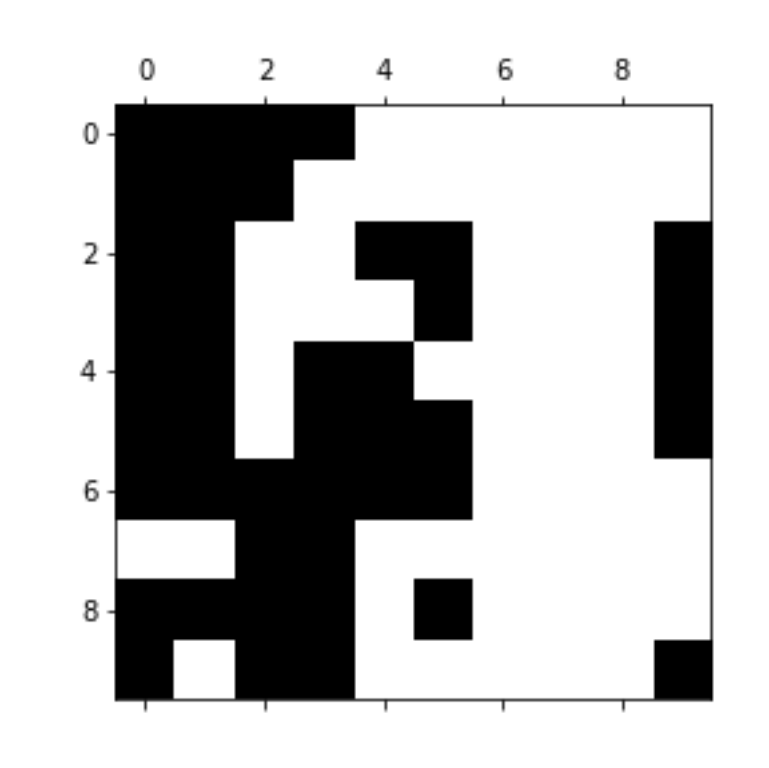
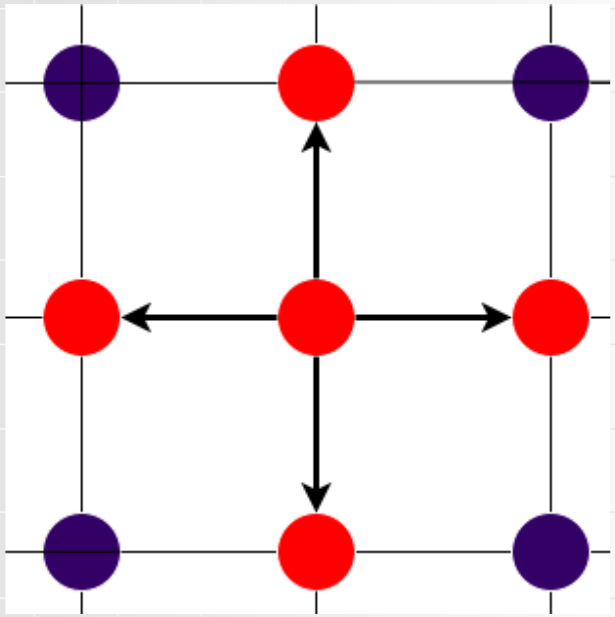
HR EXCELLENCE IN RESEARCH

# 2D Ising Model



# Phase transition and parameters

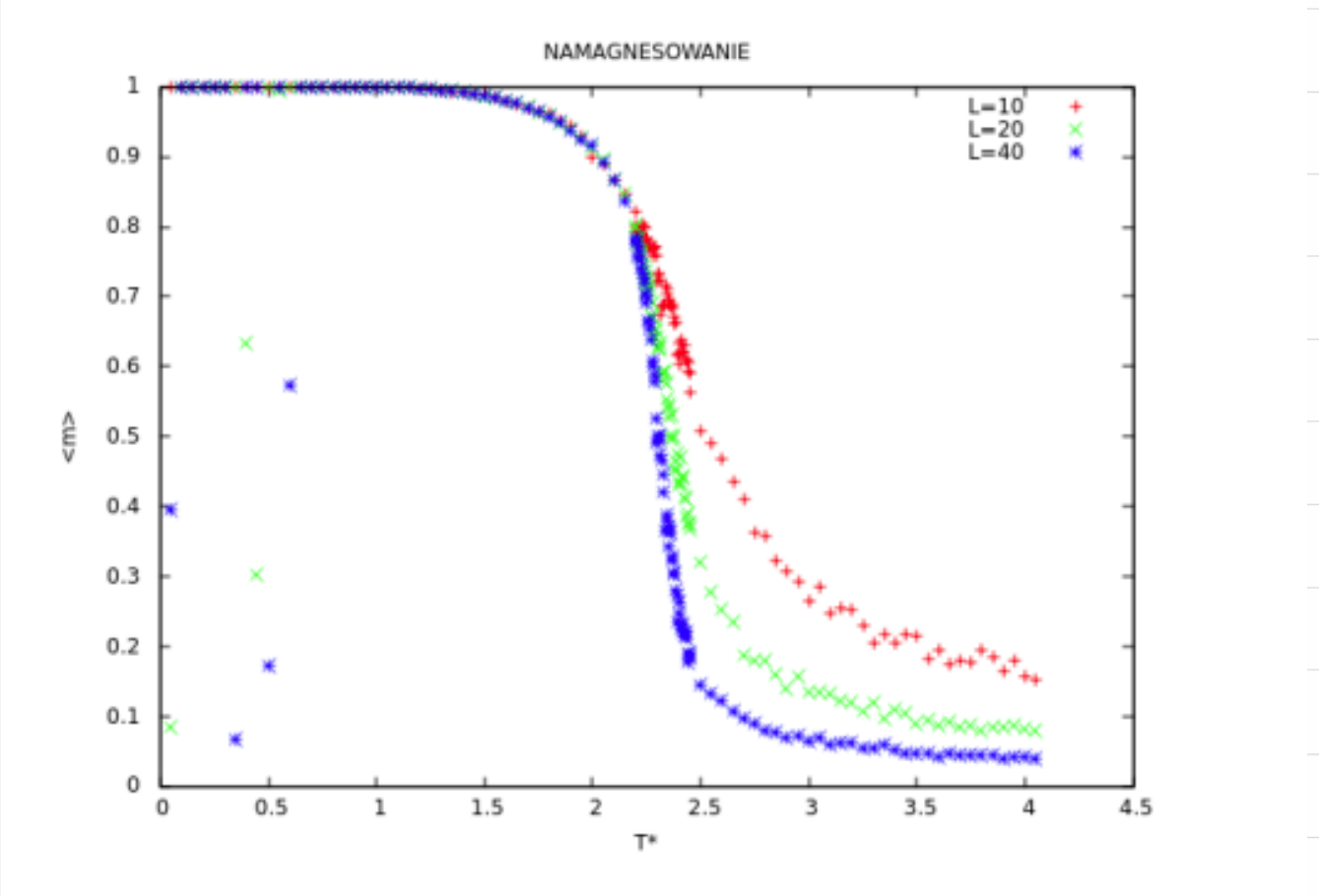
Steps = 50 000

T = 0.1 – 4.0

ΔT = 0.1

Lattice size:

- 10
- 20
- 30
- 40
- 50



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# Methods

## Method I

Analysis of the dependence of the average phase adjustment on the temperature. We can easily calculate critical temperature from this relationship, using linear regression.

## Method II

Based on analysis Mean Square Error and temperature, critical temperature should appear at the point were this dependency increases rapidly. To accomplish this computations, necessary was to calculate the magnetization of the system.

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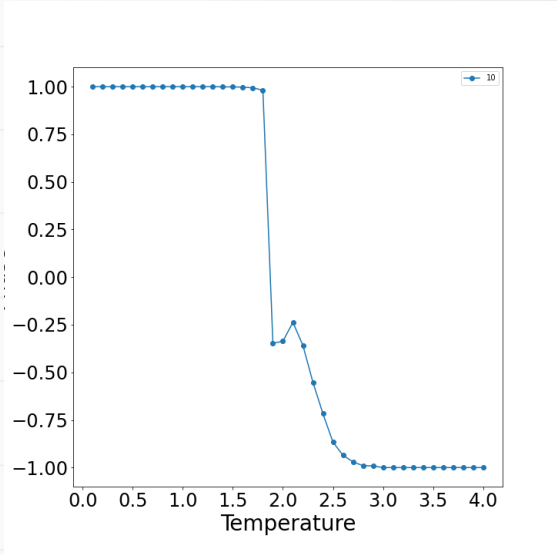
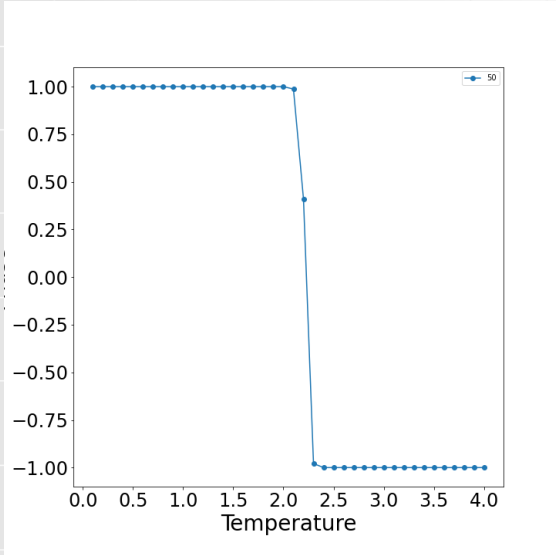
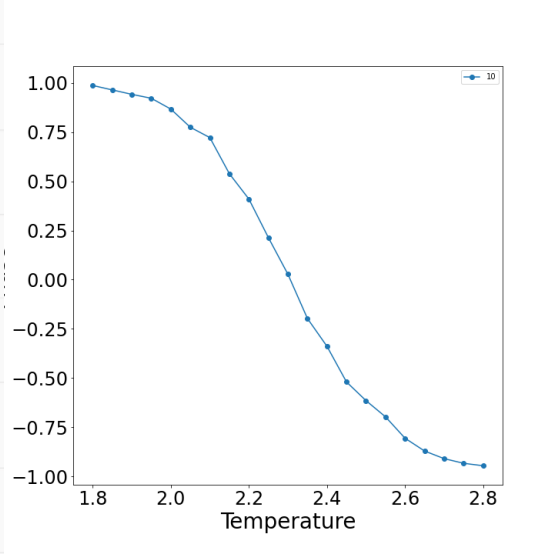
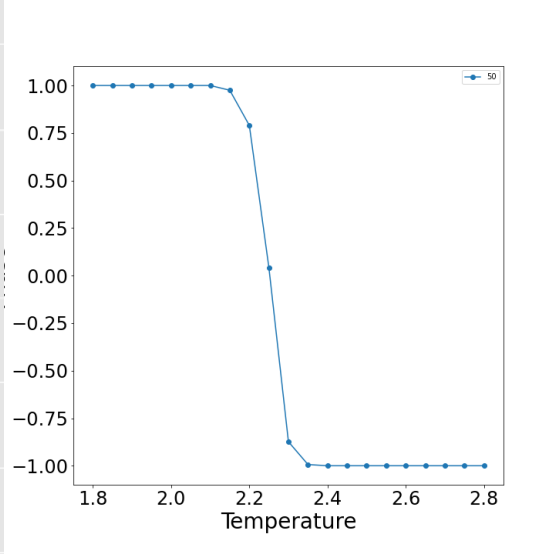
# Results

## Method I



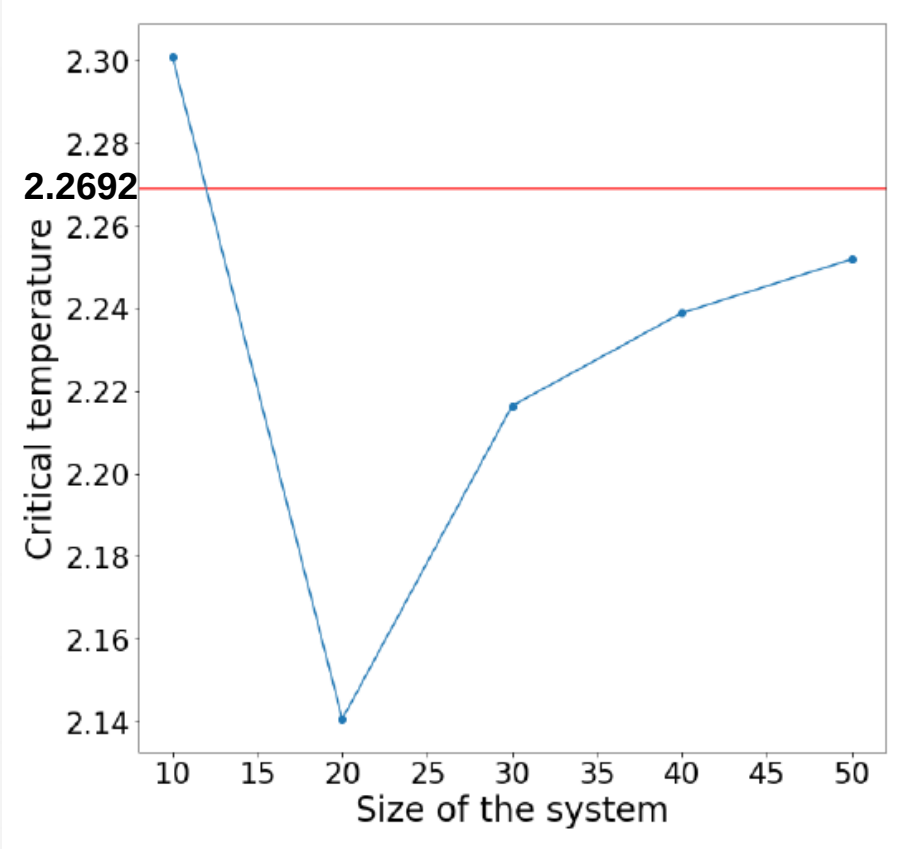



# Results

Method I

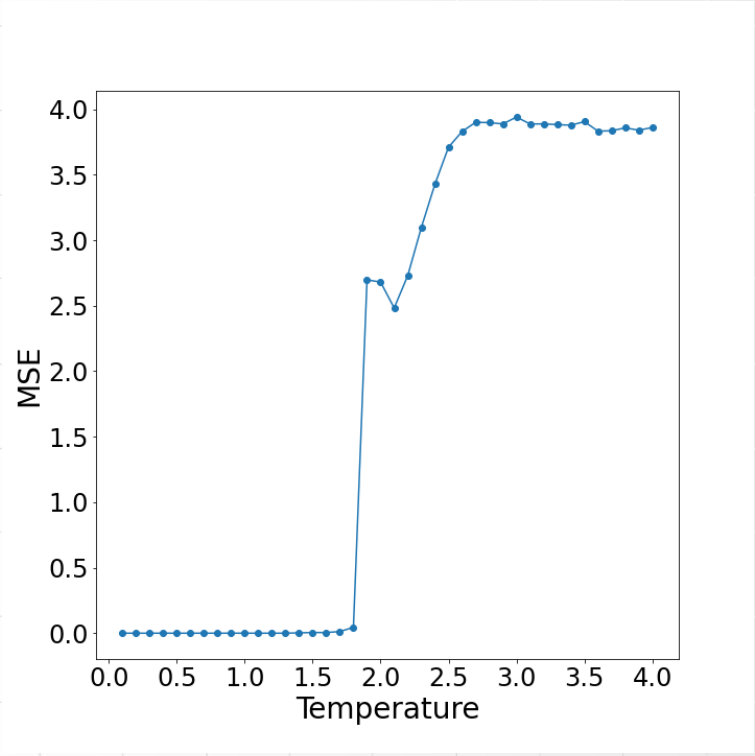
| System size L | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| Critical temperature | 2.3009 | 2.1407 | 2.2165 | 2.2390 | 2.2520 |

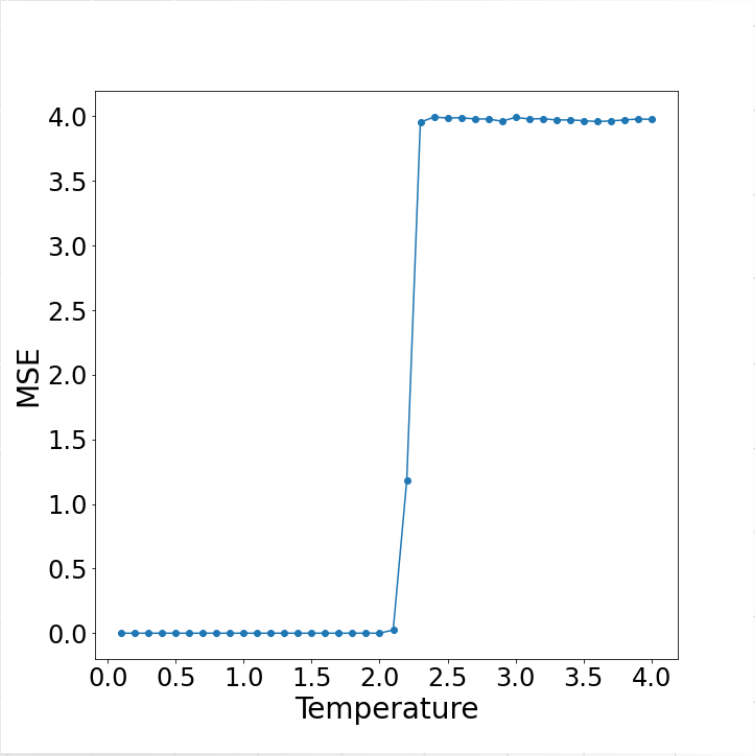


# Results

Method II

| System size L | 10 | 20 | 30 | 40 | 50 |
|---|---|---|---|---|---|
| Critical temperature | 2.7 | 2.5 | 2.4 | 2.3 | 2.3 |



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# Thank you for your attention