CS 420

Project 2

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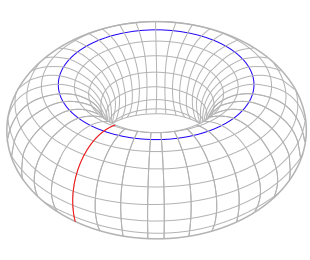
**Activation/Inhibition Cellular Automata**

**Project report**

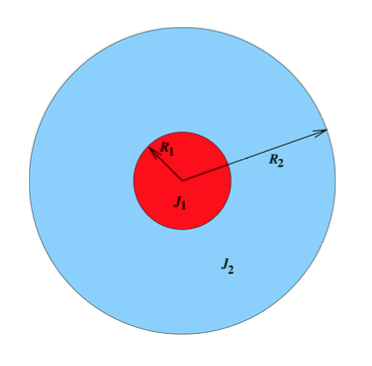
**Abstract:**

In this project, the goal is to investigate and measure the creation of spatial structures by an activator/inhibitor cellular automata (AICA). There are 3 experiments where each uses different but fixed and parameters, and different combinations of another 3 parameters - . Spatial structure gets initialized randomly with 2 possible states, 1and -1, and then it gets updated (asynchronously), depending on experiment parameters and rules, until all cells converge into a stable state. After CA is converged, the task is to calculate spatial correlation and mutual information, and to analyze data.

(For the ease of this experiment, I’ve written Java application that automates the process of generating/updating cell grid, along with calculating all the required measurements. Simulator also outputs all the pictures, data in *.csv* format and creates *.html* files for each experiment with its pictures.)

**Variables:**

Cellular space dimension – 30 x 30, space is torus

Interaction strength:

– activation system

– inhibition system

Interaction range:

– center

– around center

– bias parameter

- distance between 2 cells