Lattice Boltzmann Equation:

Second Java Version

This version is based on the code in the book *Lattice Boltzmann Method: Principles and Practice* by Kruger, Kusumaatmaja, Kuzmin, Shardt, Silva and Viggen.

# Setup

Cells set up in a square grid pattern.

Scale it at

9 velocities, represented by *ci*, are arranged by coordinates like this

|  |  |  |
| --- | --- | --- |
| (-1,1)6 | (0,1)2 | (1,1)5 |
| (-1,0)3 | (0,0)0 | (1,0)1 |
| (-1,-1)7 | (0,-1)4 | (1,-1)8 |

The maximum speed is

Kinematic viscosity

Relaxation Time

## Initialize the state

Initialize the state of each cell using Taylor-Green at time t = 0 at grid position *(x, y)*.

## Initialize the distribution function

Initialize the distribution function of each cell to equilibrium

# Run the simulation

Now, loop through each time step, and pass the whole grid into these functions

## Streaming

This is simply copying the function for each index from the neighbor as specified in the grid to the destination. So, f1 will be copied from the right neighbor, and f2 will be copied from the top neighbor. The grid is periodic, so if we are at the bottom of the grid, we’ll take the top, etc.

What do we do with f0?

## Compute State

## Collide