

# Master Thesis Report

Jérémie Guy

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## Abstract

lb, clot, tpa etc.

## 1 Introduction

fluid simulation, computer power, thrombolysis, tPA etc.

## 2 Lattice Boltzmann

1. d2q9 (velocity vectors, weights, cs2 = intermediary report I)
2. fluid definition (viscosity, velocity, omega, rho = intermediary report I)
3. collision (= intermediary report I)
4. streaming (= intermediary report I)

## 3 System conditions

1. bounceback (point based, mask = intermediary report I)
2. outlet (destroy outgoing populations = intermediary report I)
3. inlet zou-he (compute missing rho = intermediary report I)

## 4 Sanity check

1. fluid initialisation (parameters velocity, viscosity etc)
2. poiseuille flow : all velocity profiles iterations (Annex : wrong profiles - use area and not tube = report I + decreasing max velocity = report IV)
3. population sum : with in/out stop, without, zou-he increase (Annex : all tries with zou-he and other giving wrong profiles = report IV)
4. Annex (bb node velocity accumulation, zou-he architecture with bb nodes = report II & III)

## 5 Clot implementation

1. PBB with zou-he (wrong velocity inside clot, no expected profiles = report V)
2. FF clot (tube implementation = report VI)

## **6 System topology redefinition**

1. cycling system (no inlet and outlet, loop = report VII)
2. sanity check (velocity profiles, system size, k values = report VII)
3. looping system with branch (report VII)

## **7 Clot Dissolution**

1. dissolution proportionnal to flow (report VIII)
2. adding tPA (d2q4, streaming, collision, constant injection, initialisation)
3. dissolving clot with tPA (binding tPA, portion of tPA binded dissolution, updateing tPAin, liberating tPA when empty)

## **8 Final results**

1. fluid pressure with and without branch on clot
2. K values, K leftmost, function fit,

## **9 Future work**

1. adding experimental conditions
2. complexifying topology
3. going in 3D

## **10 Conclusion**

## **11 Annex**

1. wrong velocity profiles (report I)
2. bb node velocity accumulation (report II & III)
3. decrease max velocity (report IV)

## **12 References**