CS184 Project 4: ClothSim

Due: April 12, 2022

Wow haha isn't that a coincidence that the day this assignment is due is also the day I lost my dog a year ago. I remember already being in a mess then, but at least it's not as bad as it is now. It's still pretty bad.

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Overview

This project focused on creating a physics-based recreation of a square cloth folding and falling over itself. Given a `.json` file in the `scene` folder, I set out to create a grid of point masses and springs to approximate a cloth material and implemented a simulation via numerical integration. I repeatedly ran into issues with creating evenly spaced apart point masses in the simulation. The biggest obstacle at this point is getting the simulation to run faster.

Part 1: Masses and springs
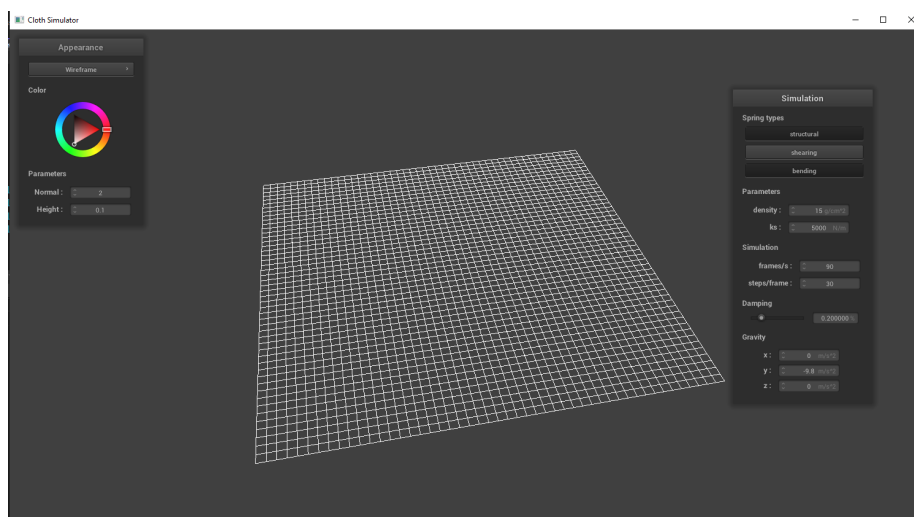

Figure 1: pin2.json with no shearing constraints

Figure 1 displays `pin2.json` with no shearing constraints. The removal of said constraints leads the simulator to not display any diagonal springs. I ran into indexing issues with determining which springs should receive what, especially for `BENDING` constraints.
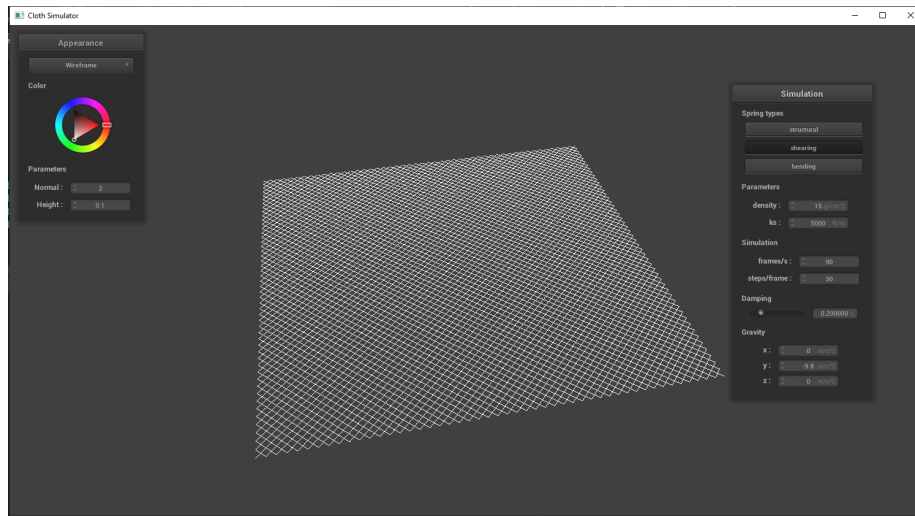
Figure 2: pin2.json with only shearing constraints

Figure 2 displays `pin2.json` with only shearing constraints. This shows exclusively diagonal springs.

Figure 3 displays `pin2.json` with all constraints. This includes diagonal, horizontal and vertical springs.

Part 2: Simulation via numerical integration

I was hoping to include changes based on extreme values of `ks` and variable `density` and `damping`. There seems to be an issue with the spring length constraints applied to the cloth because it implodes and explodes durin the simulation.

Figure 4 is all I am able to produce for this part.

Part 3: Handling collisions with other objects

Part 4: Handling self-collisions

Part 5: Shaders

Web Page

Written in Markdown, hosted on GitHub https://github.com/cal-cs184-student/sp22-project-webpages-AlbertScribblenaut/blob/master/proj4/index.md
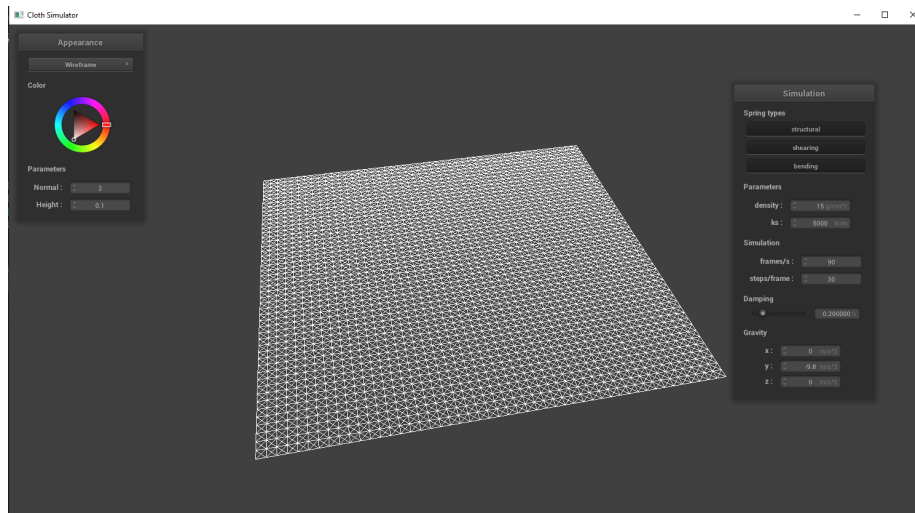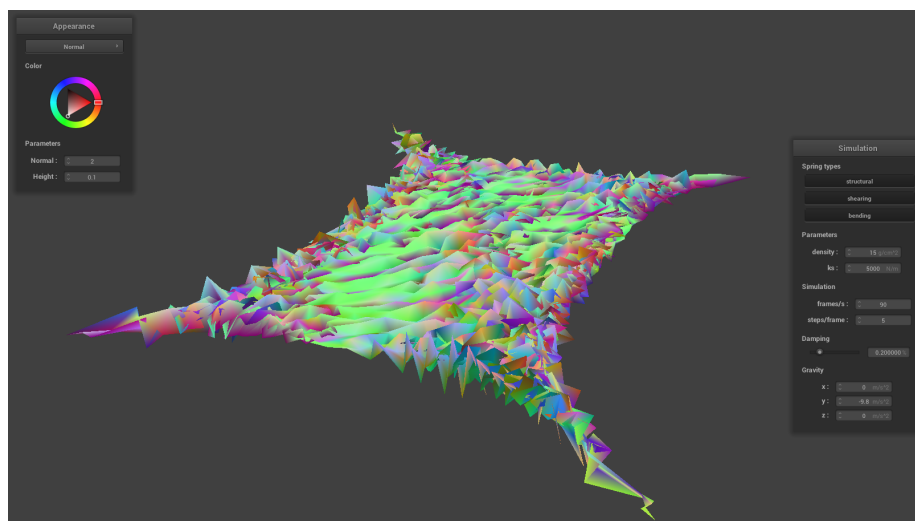
Figure 3: pin2.json with all constraints

Figure 4: pin4.json when calling Cloth::simulate()