COL781 A3

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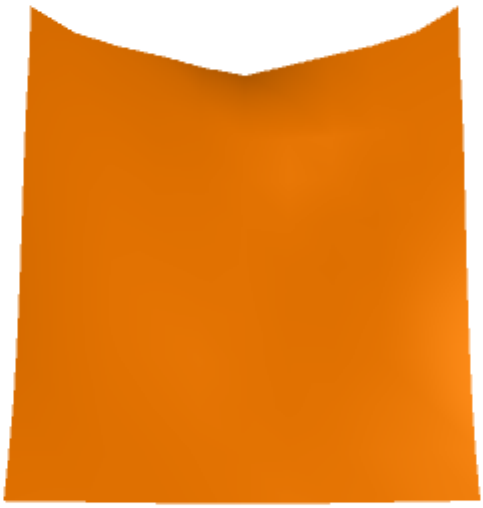
1 Screenshots and Recordings

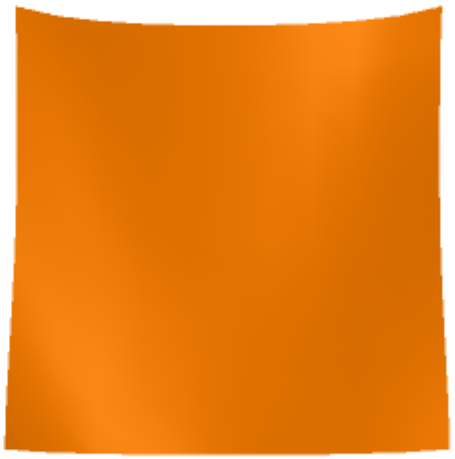
1.1 Mass Spring System

1.1.1 Without PBD



Click here for the video.

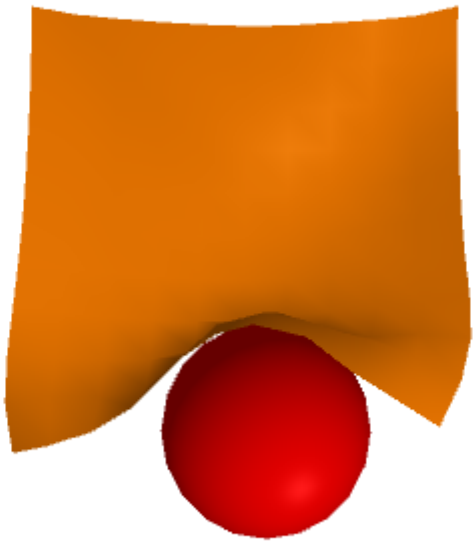
1.1.2 With PBD



Click here for the video.

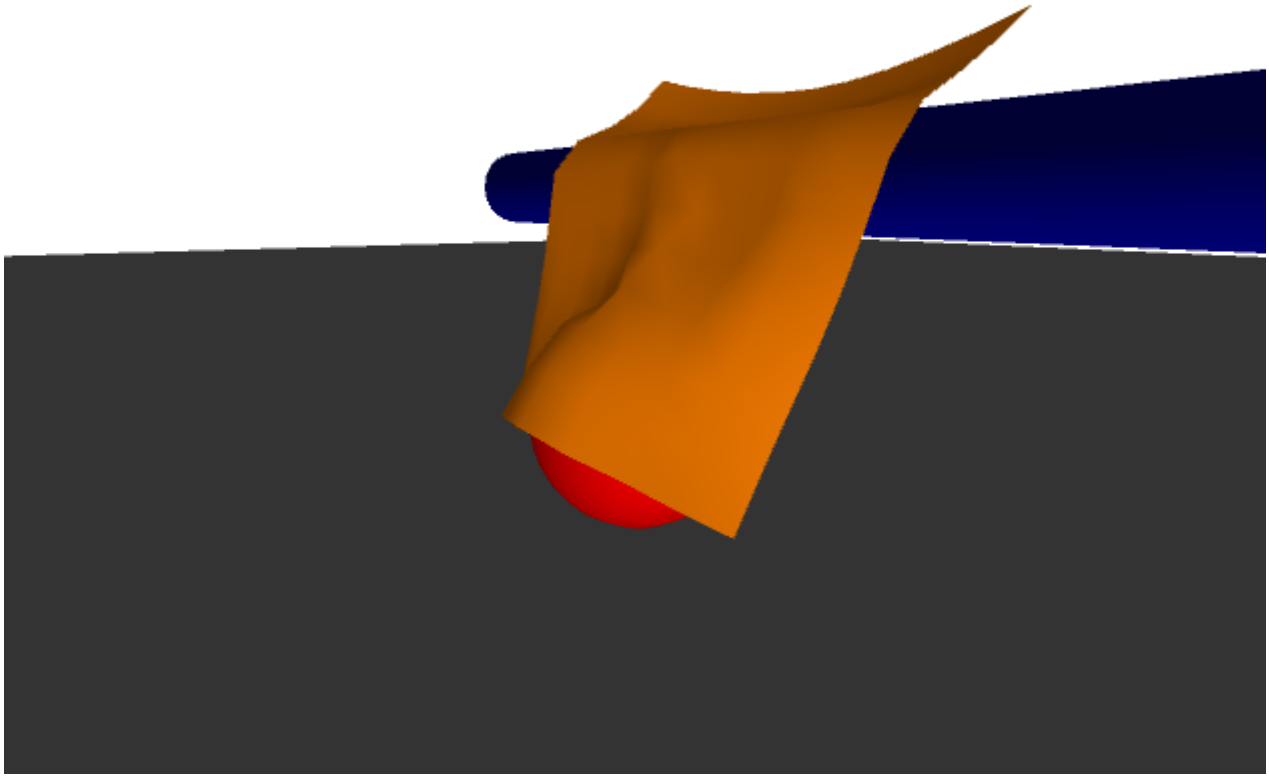
1.2 Object Collision

1.2.1 With Sphere



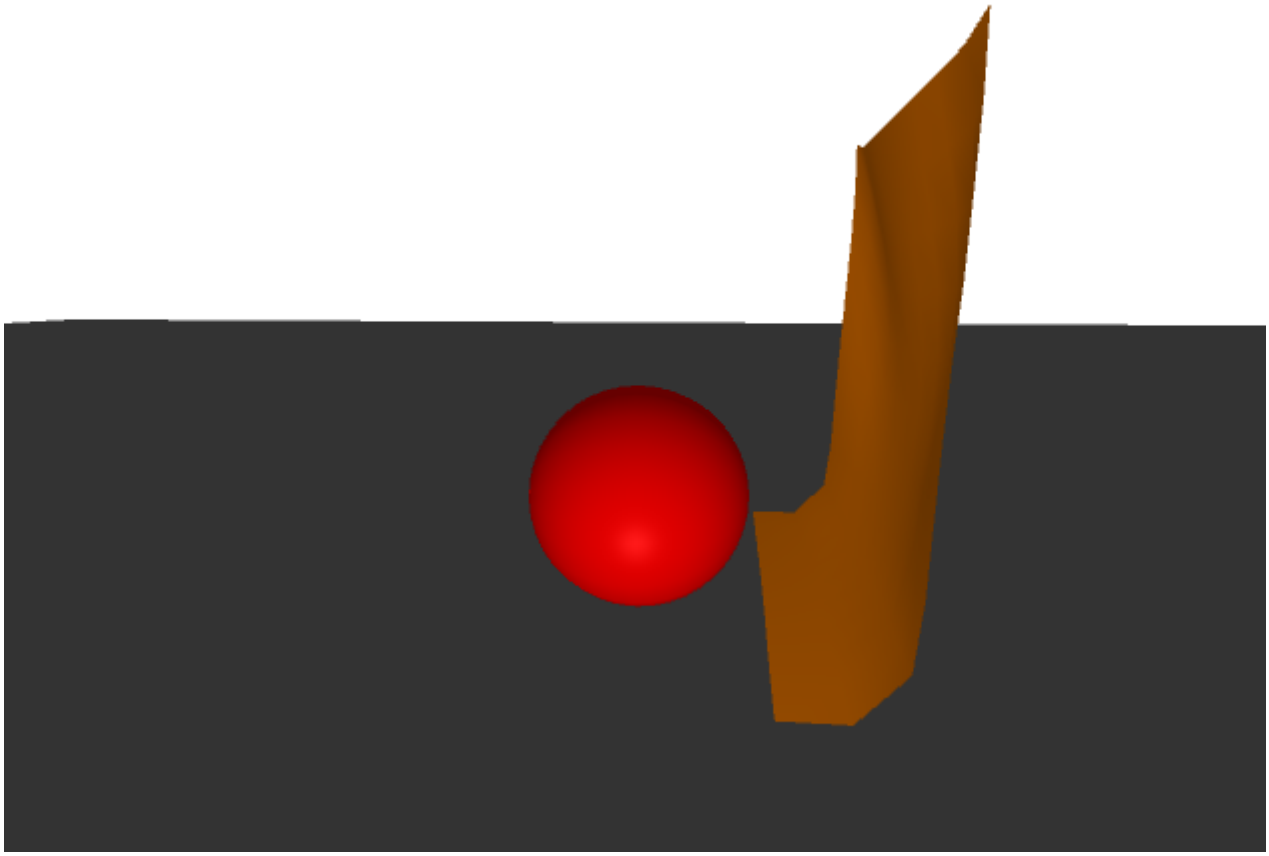
Click here for the video.

1.2.2 With Sphere and Cylinder



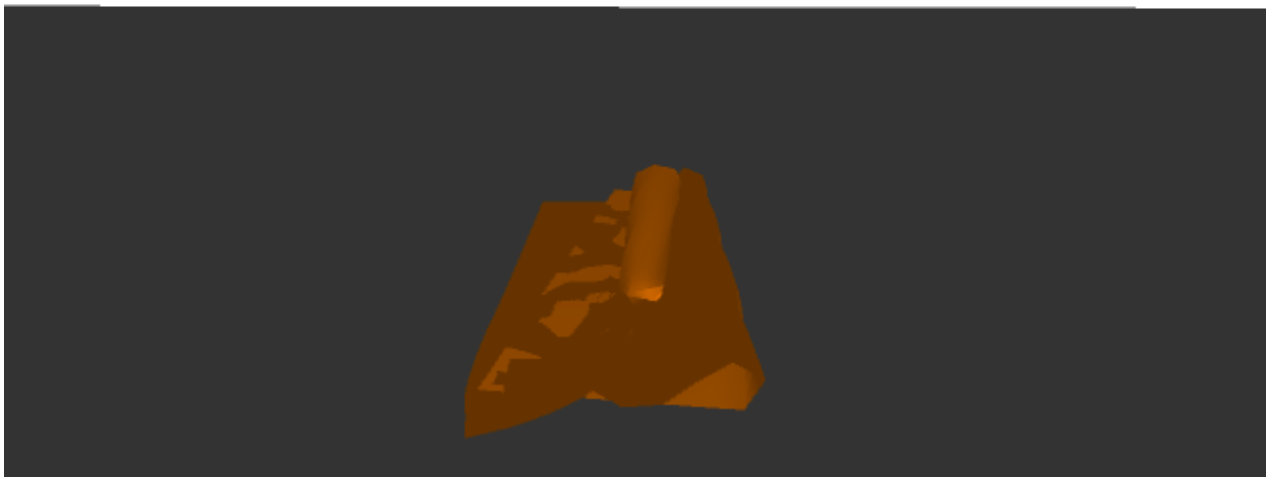
Click here for the video.

1.2.3 With plane



Click here for the video.

1.2.4 Without self collision detection



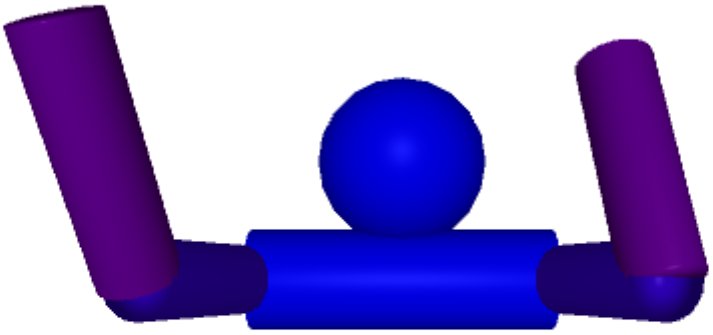
Click here for the video.

1.2.5 With self collision detection

Click here for the video.

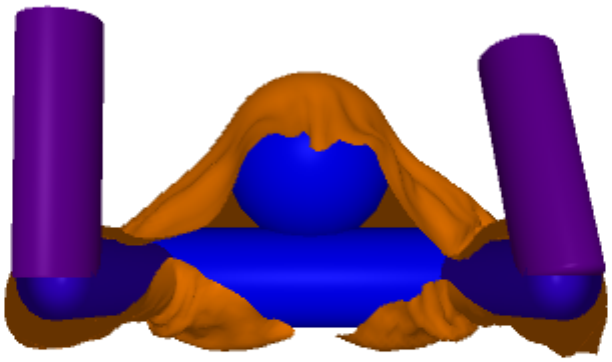
1.3 Animation

1.3.1 Character



Click here for the video (ignore the first few frames).

1.3.2 Character with cloth



Click here for the video (ignore the first few frames).

2 Discussion

1. When I first implemented PBD, I considered collisions as well in the constraints as mentioned in the original paper. In the paper, the authors damped the velocities after finalizing the final positions of the particles. But the results this generated looked like the sheet was sliding over the obstacles without any friction. Hence, I am not doing collision detection in PBD. In PBD, I am only checking for the cloth's structural constraints and self-collision.
2. The hinge axis is fixed for every joint in the character. I only specify the values of the hinge angle for each time step.
3. All objects have a collider at a distance of $0.02f$ from their surface. This is to reduce penetrating edges as much as possible.
4. The cloth moves a little slowly. This is because I had to set gravity to a small value to prevent the cloth simulation from exploding.