Project Flamenco

Vasu Mahesh & Zach Corse

Objective

Implement a Position-Based Dynamics (PBD) cloth simulation algorithm on the GPU using predictive constraints – a technique introduced at GDC 2018 by EA's Frostbite team.

Currently, this runs on the Frostbite Engine but no game has shipped with this tech so far. Anthem may be the first.

Project Milestones

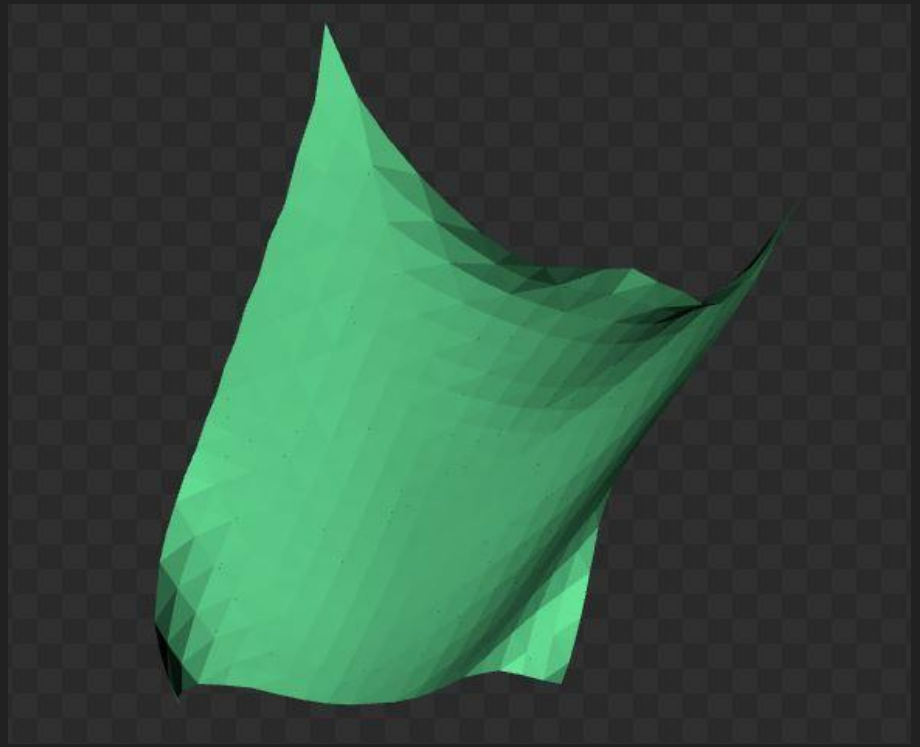
11.19
- (CPU) core PBD algorithm
- Cloth mesh discretization
- Distance + bending constraints

11.26
- (GPU) core PBD algorithm
- Jacobi-style constraint solver using D3D12 compute shaders
- Environment collision constraints

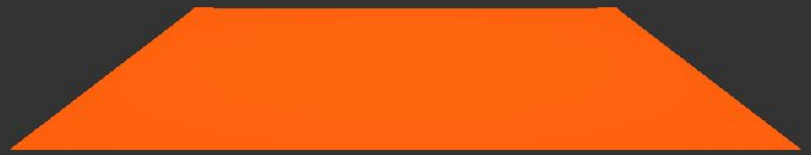
12.03
- Self-collision constraints using predictive contacts
- Acceleration structure using AABB
- Rendering pipeline

12.07
- FINAL PRESENTATION

Cloth Mesh Discretization



(CPU) Core PBD Algorithm for Cloth Simulation



15 x 15

$k_{distance}$ = 0.5

$k_{bending}$ = 0.3

g = -1.8

FPS = 24

20 x 20

$k_{distance}$ = 0.9

$k_{bending}$ = 0.05

g = -2.8

FPS = 24

Project Roadmap

11.19
- (CPU) core PBD algorithm
- Cloth mesh discretization
- Distance + bending constraints

11.26
- (GPU) core PBD algorithm
- Jacobi-style constraint solver using D3D12 Compute API
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