BLOWING FROM THE WEST: SIMULATING WIND IN GHOST OF TSUSHIMA

INTRO VIDEO

PS4

Volume Over Accuracy

What We Did (Differently)

WIND MODEL

Vector

+ Noise

+ “Vorticles”

(+ Displacement)

PARTICLES
Blown from the west,
fallen leaves gather
in the east – Yosa Buson

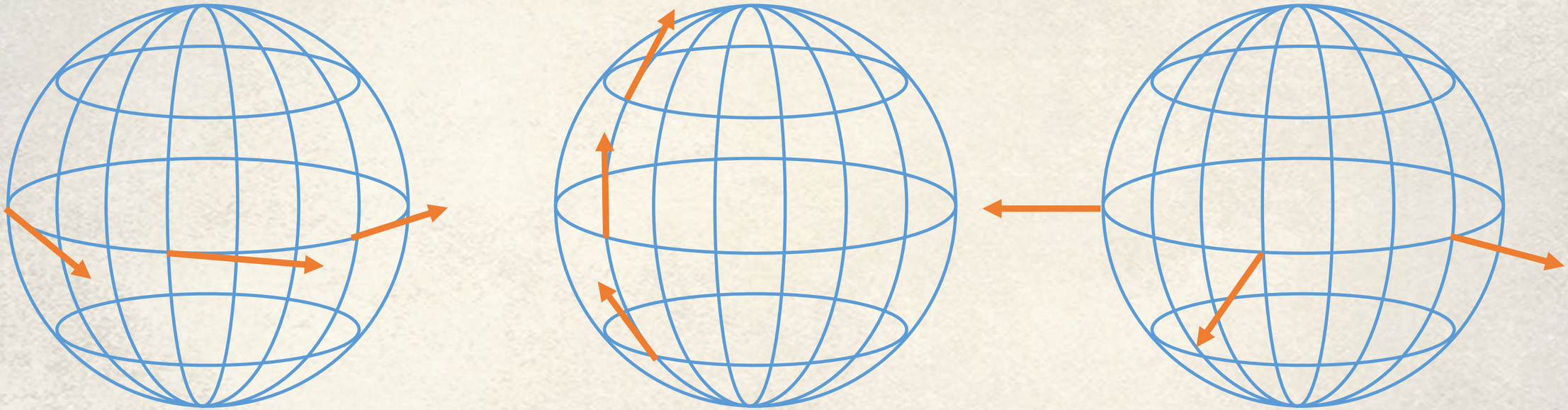
PARTICLES - INTRO

- Details in 2014 GDC session
  - https://www.gdcvault.com/play/1020367/The-inFAMOUS-Second-Son-Particle
- Particles emitted, updated, and rendered entirely on the GPU
  - ~100K particles
- Highly programmable
  - Expression-based language compiled into PSSL
  - Building blocks
  - New extensions for wind and terrain
- Matt Vainio's PlayStation.Blog
  - https://blog.playstation.com/2021/01/12/how-stunning-visual-effects-bring-ghost-of-tsushima-to-life/

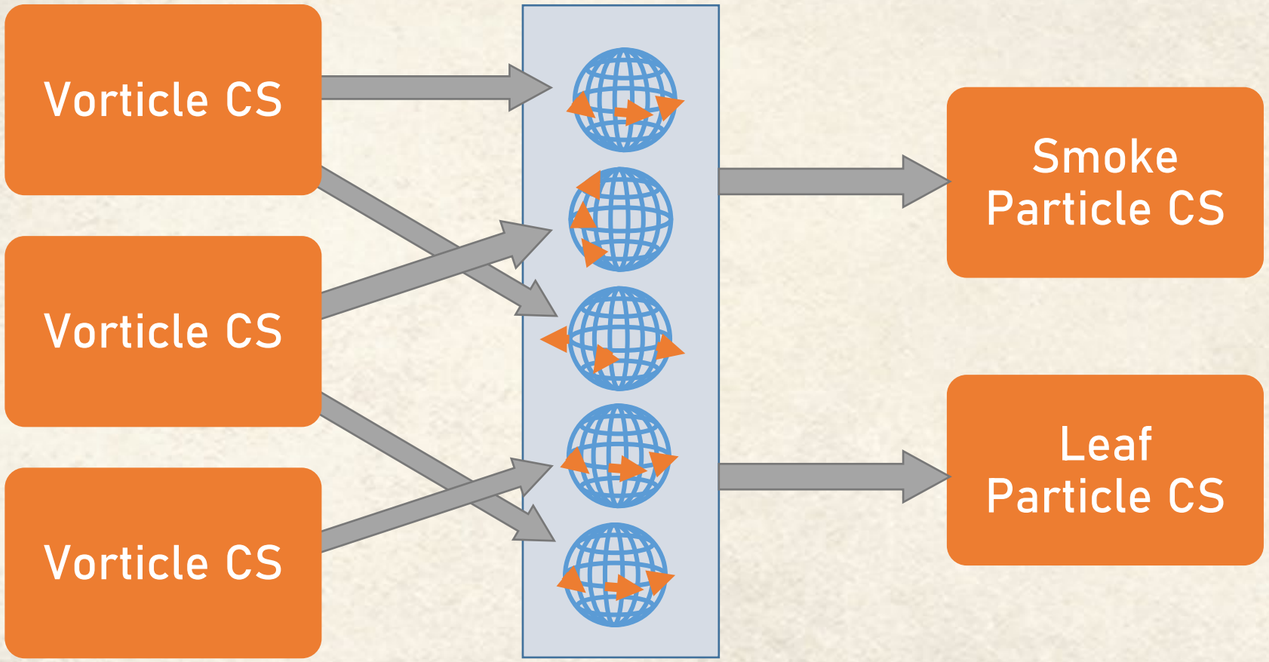
PARTICLES – LEAVES VIDEO

PARTICLES – TERRAIN VIDEO

PARTICLES – VORTICLES



PARTICLES – VORTICLES



PARTICLES – VORTICLE VIDEO

PARTICLES – VORTICLE VIDEO

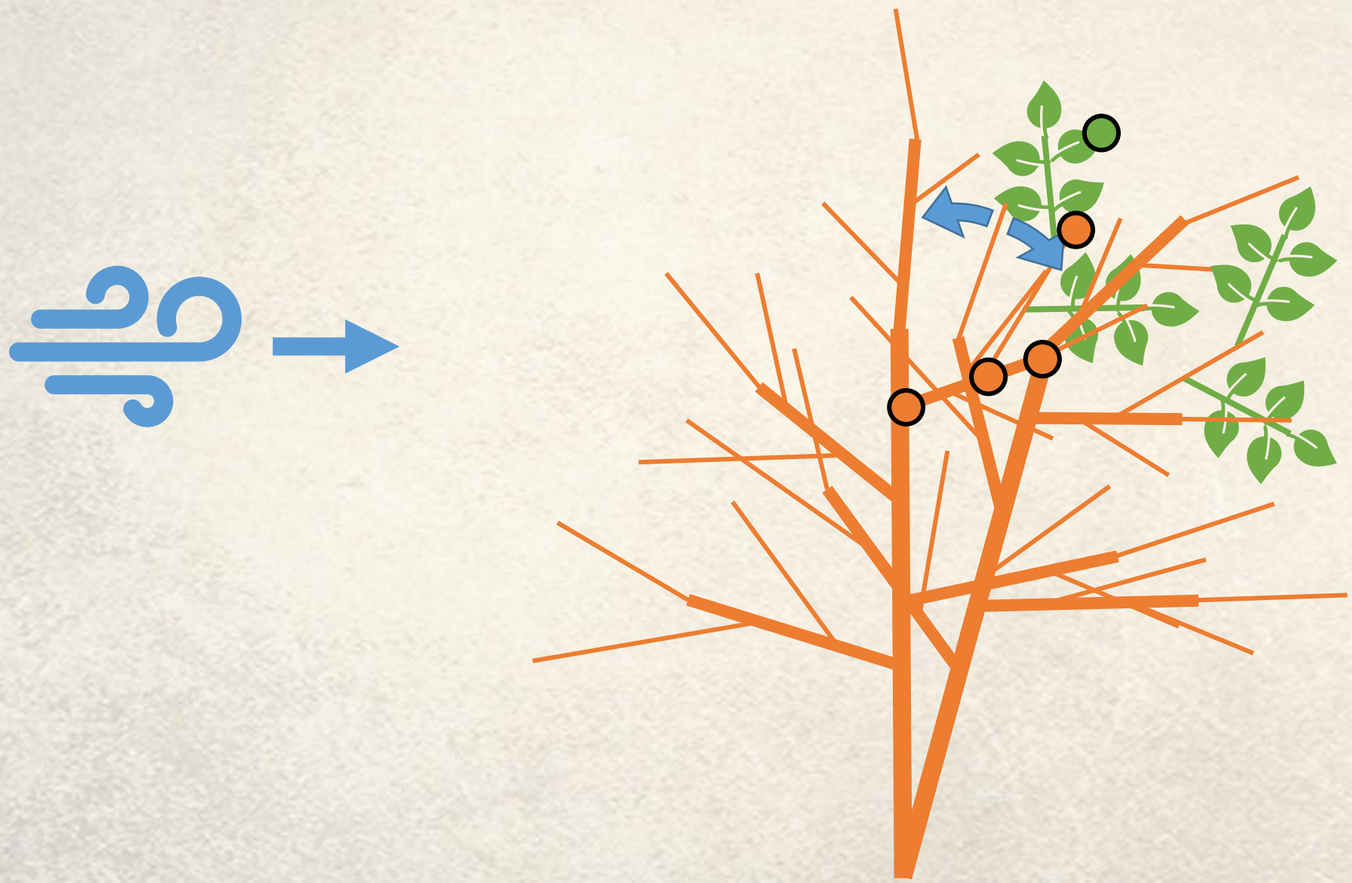
PARTICLES - ANIMATED

PARTICLES - ANIMATED

PARTICLES - ANIMATED

PARTICLES - ANIMATED

FOLIAGE
Wind in the pines
swirling round the eaves
as autumn ends – Bashō



FOLIAGE VIDEO

FOLIAGE

GRASS

A lovely name —

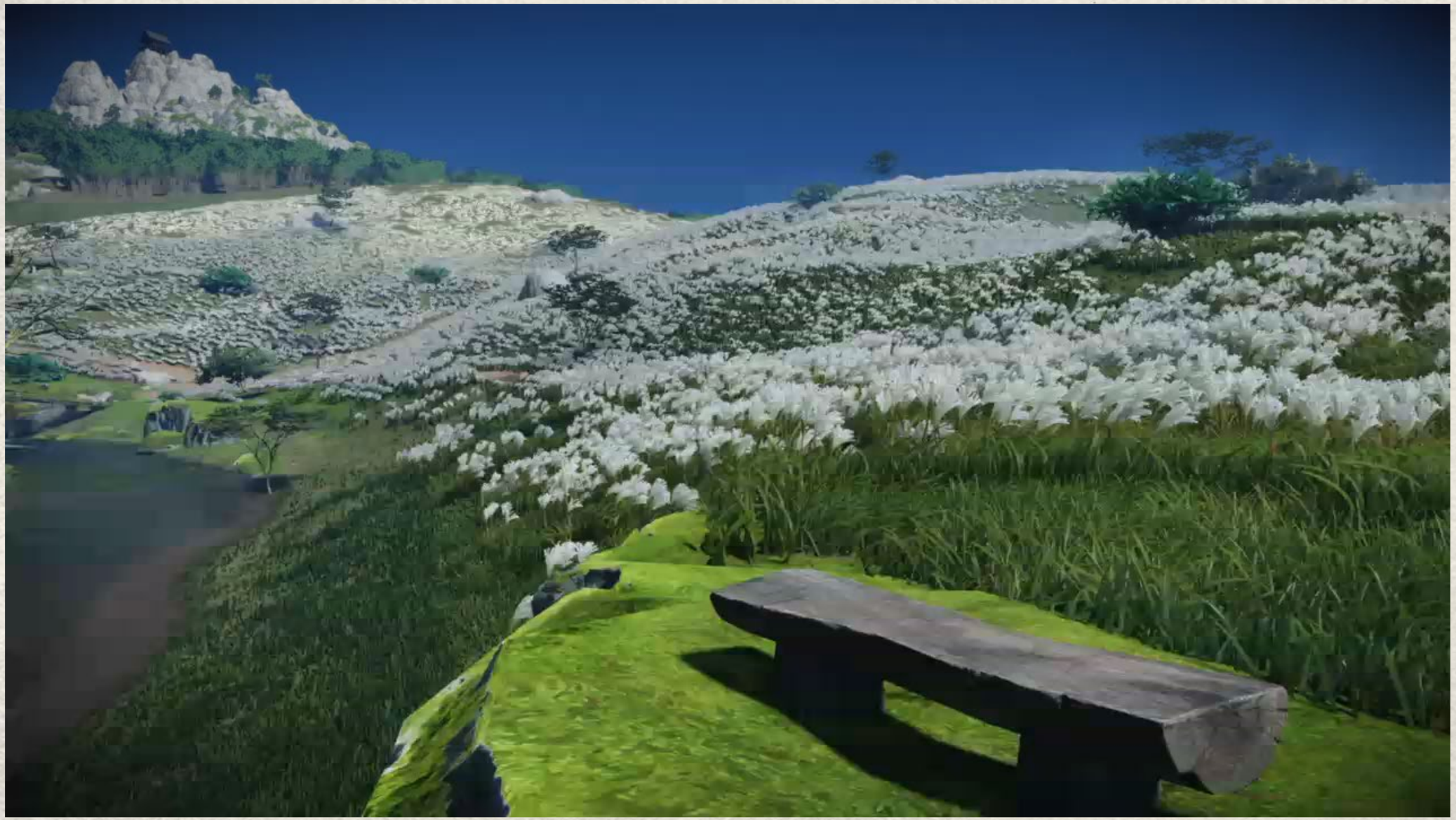
at Komatsu blows

bush clover and pampas – Bashō

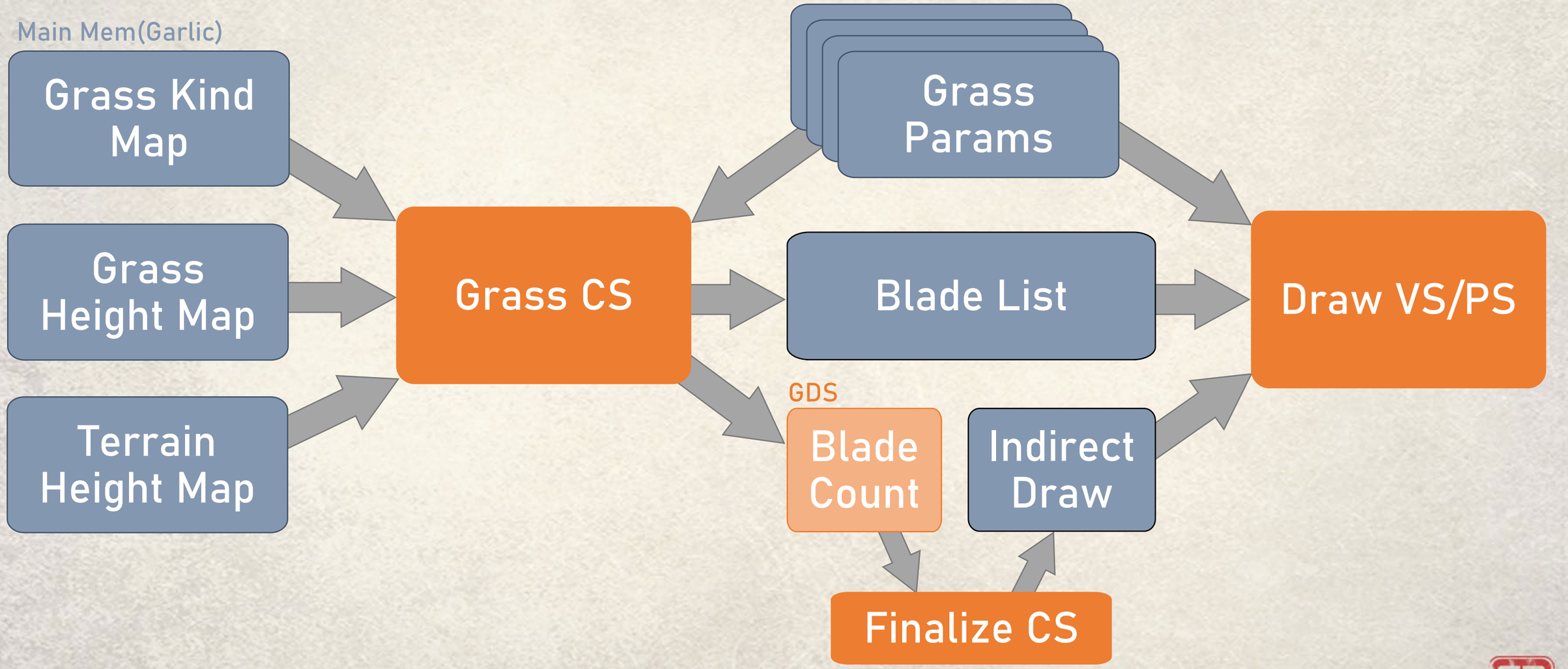
GRASS VIDEO

GRASS VIDEO

GRASS



GRASS


Main Mem(Garlic)
Grass Kind Map
Grass Height Map
Terrain Height Map
Grass CS
Grass Params
Blade List
Draw VS/PS
GDS
Blade Count
Indirect Draw
Finalize CS

GRASS

CLOTH

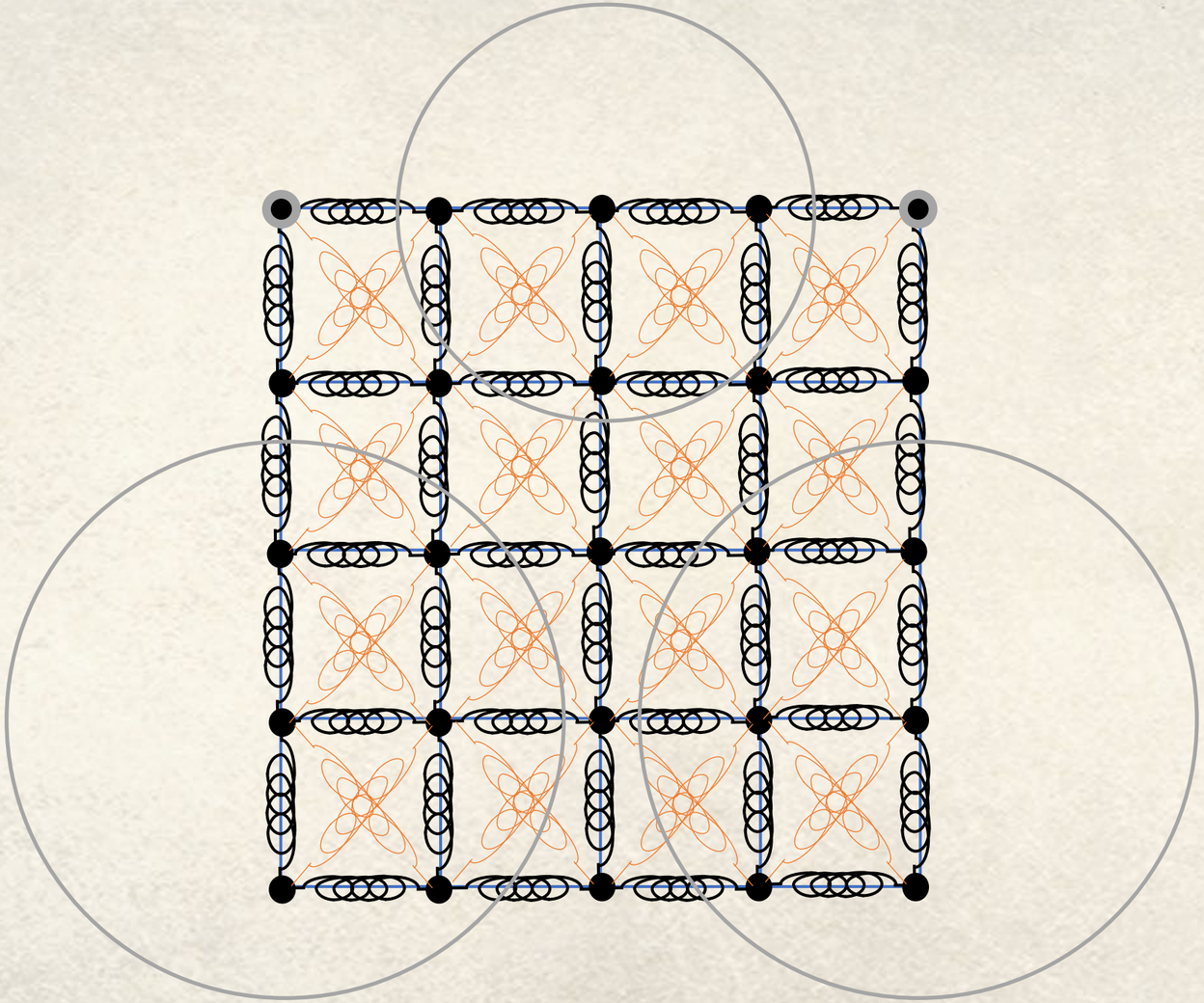
Spring rain

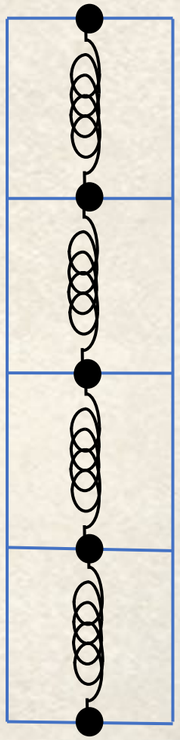
a straw rain cape blows back

as river willows - Bashō

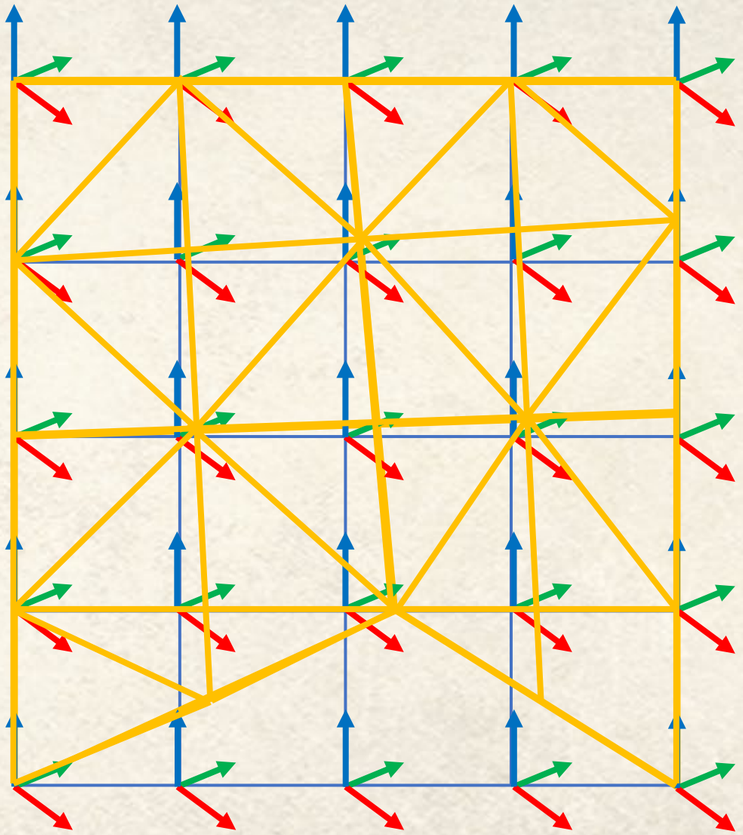
CLOTH - INTRO

CLOTH - BASICS

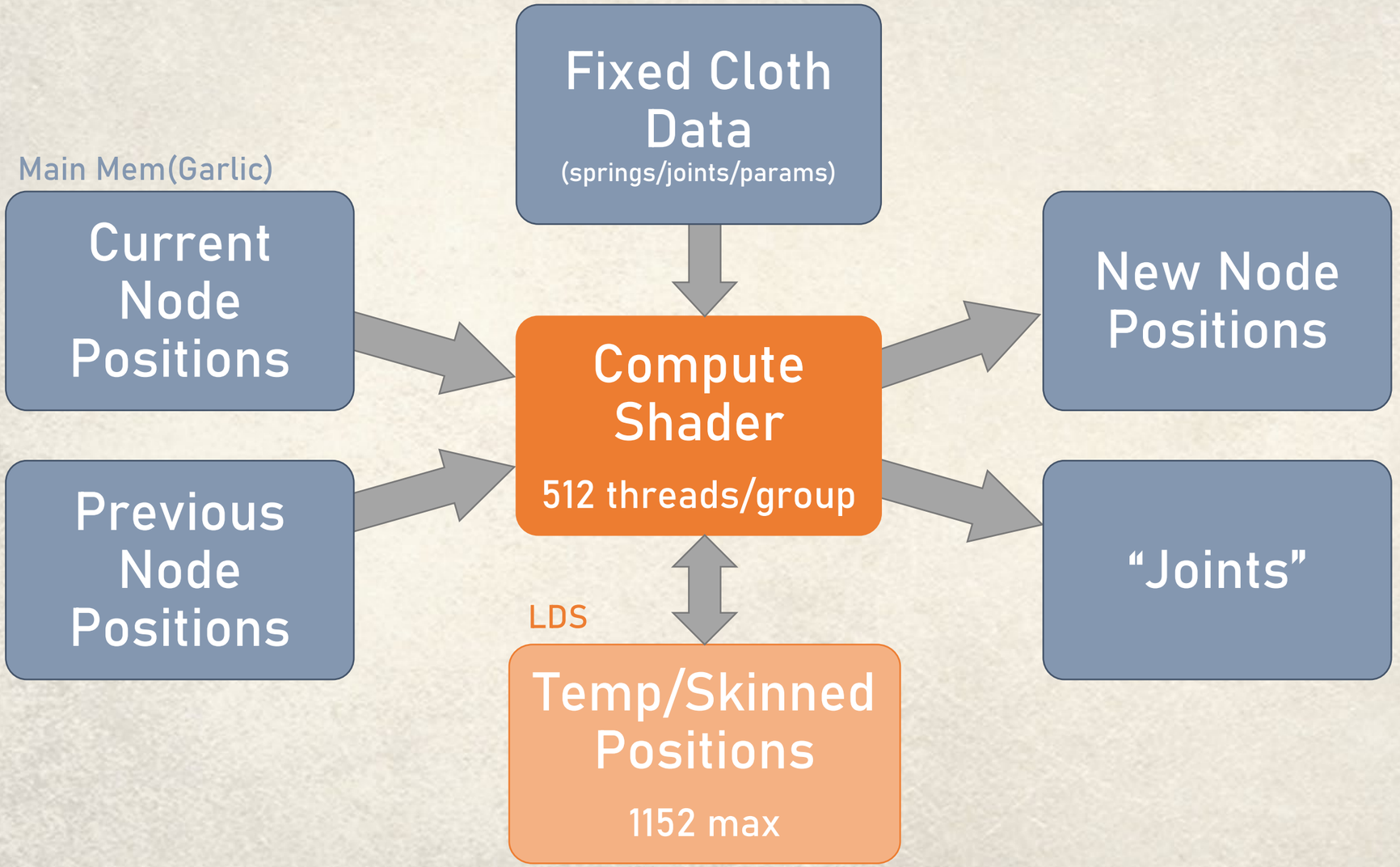




CLOTH - DRAWING



CLOTH - SIM


Fixed Cloth Data
(springs/joints/params)
Main Mem(Garlic)
Current Node Positions
Previous Node Positions
Compute Shader
512 threads/group
New Node Positions
"Joints"
LDS
Temp/Skinned Positions
1152 max

CLOTH - SIM

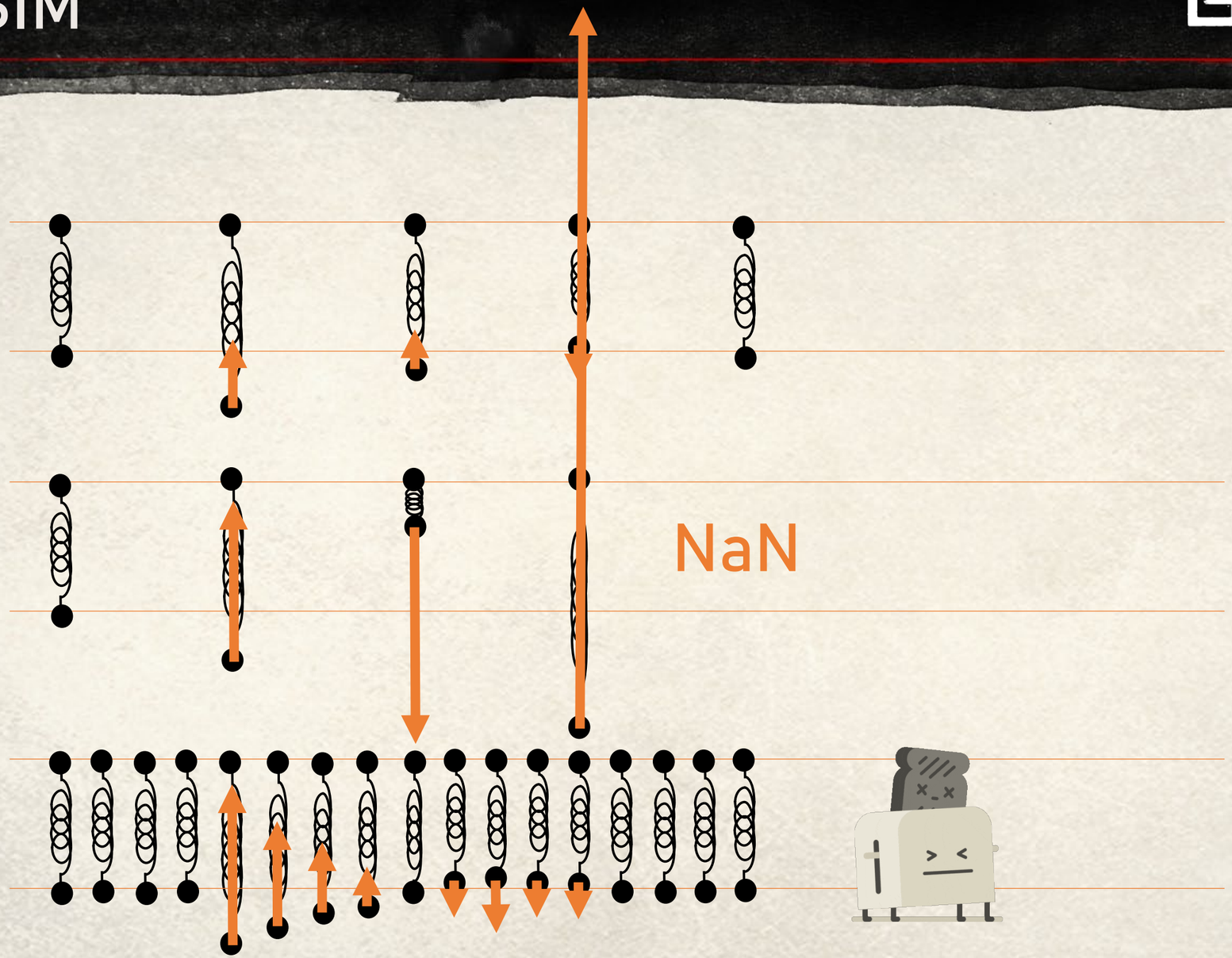
Verlet Integration

- Gravity, Wind, Inertia, Damping

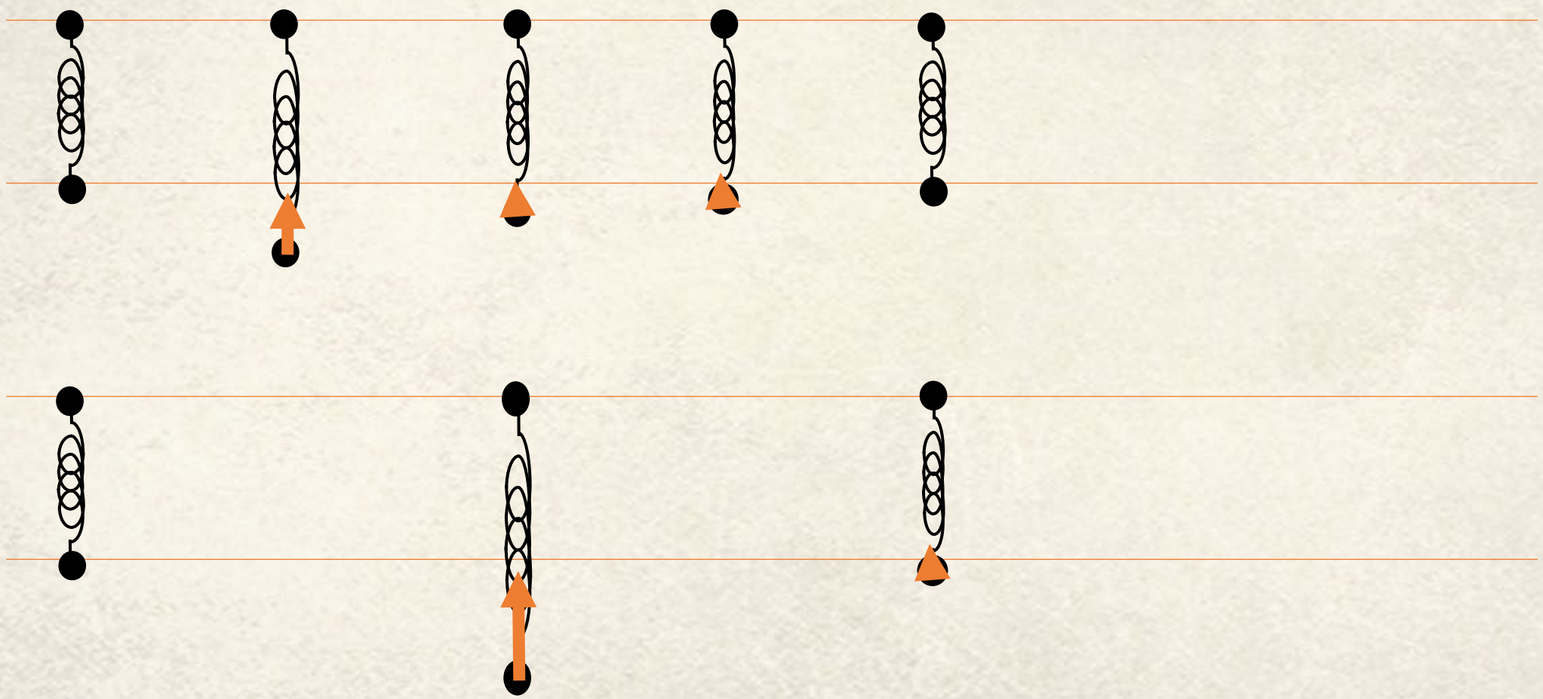
Solving Cloth

- To do it “right” takes full matrix inversion
- We’re not doing that

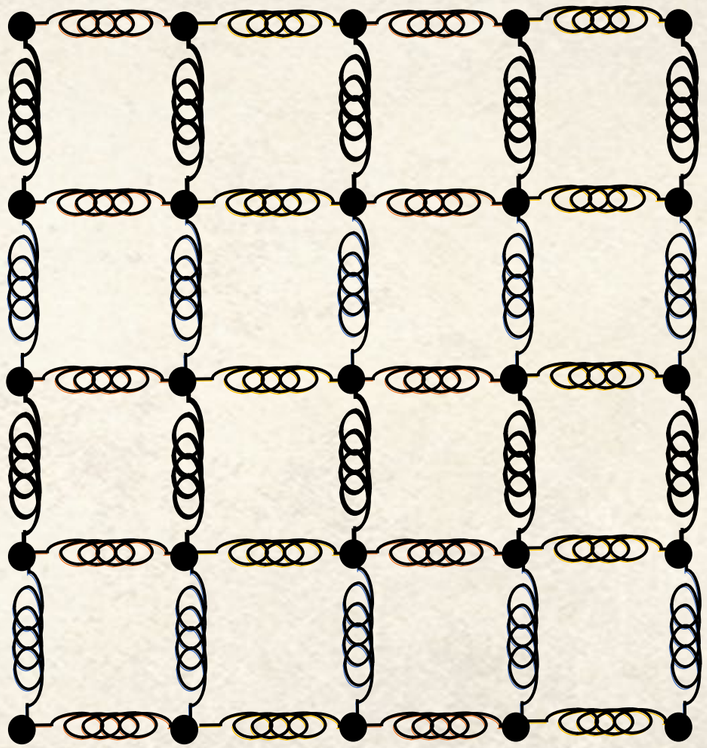
CLOTH - SIM



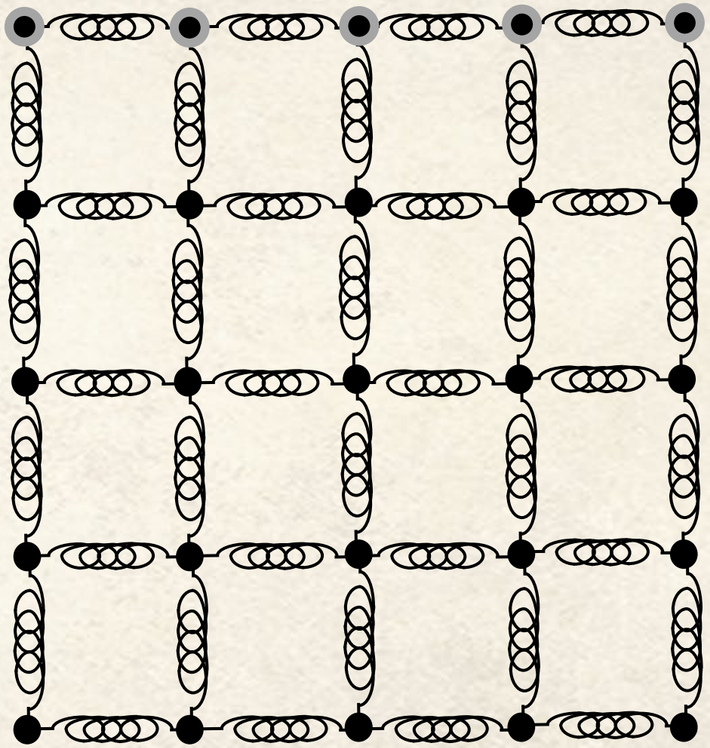
CLOTH - SIM



CLOTH - SPRING SETS



CLOTH - ANCHORS



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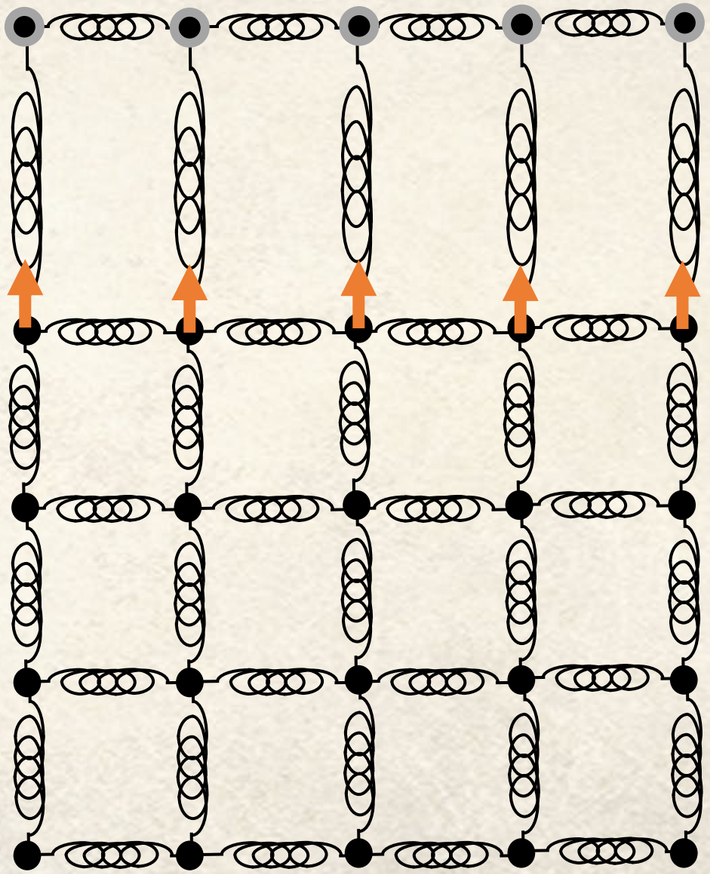

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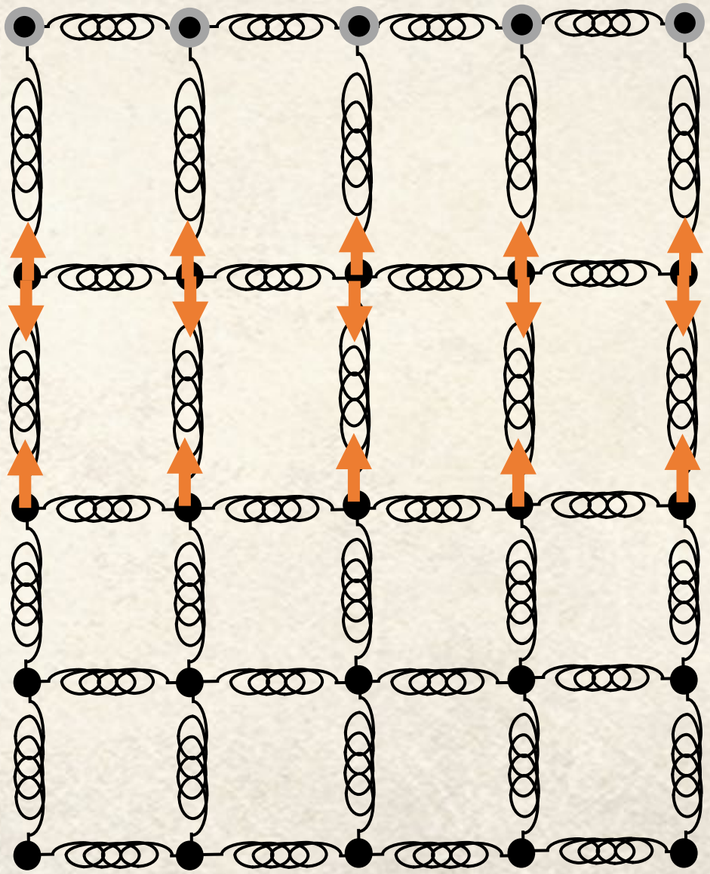
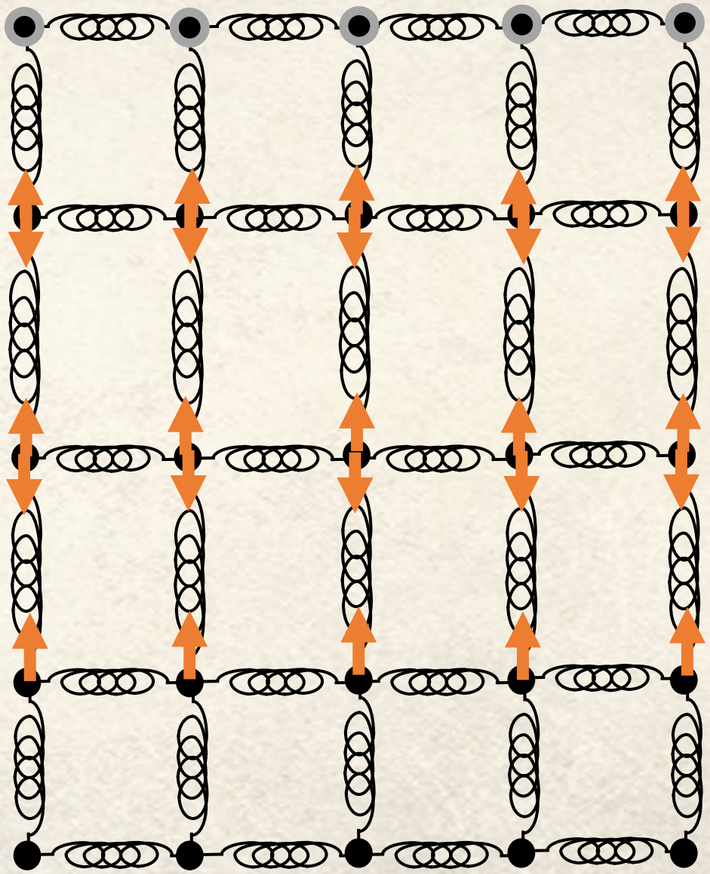
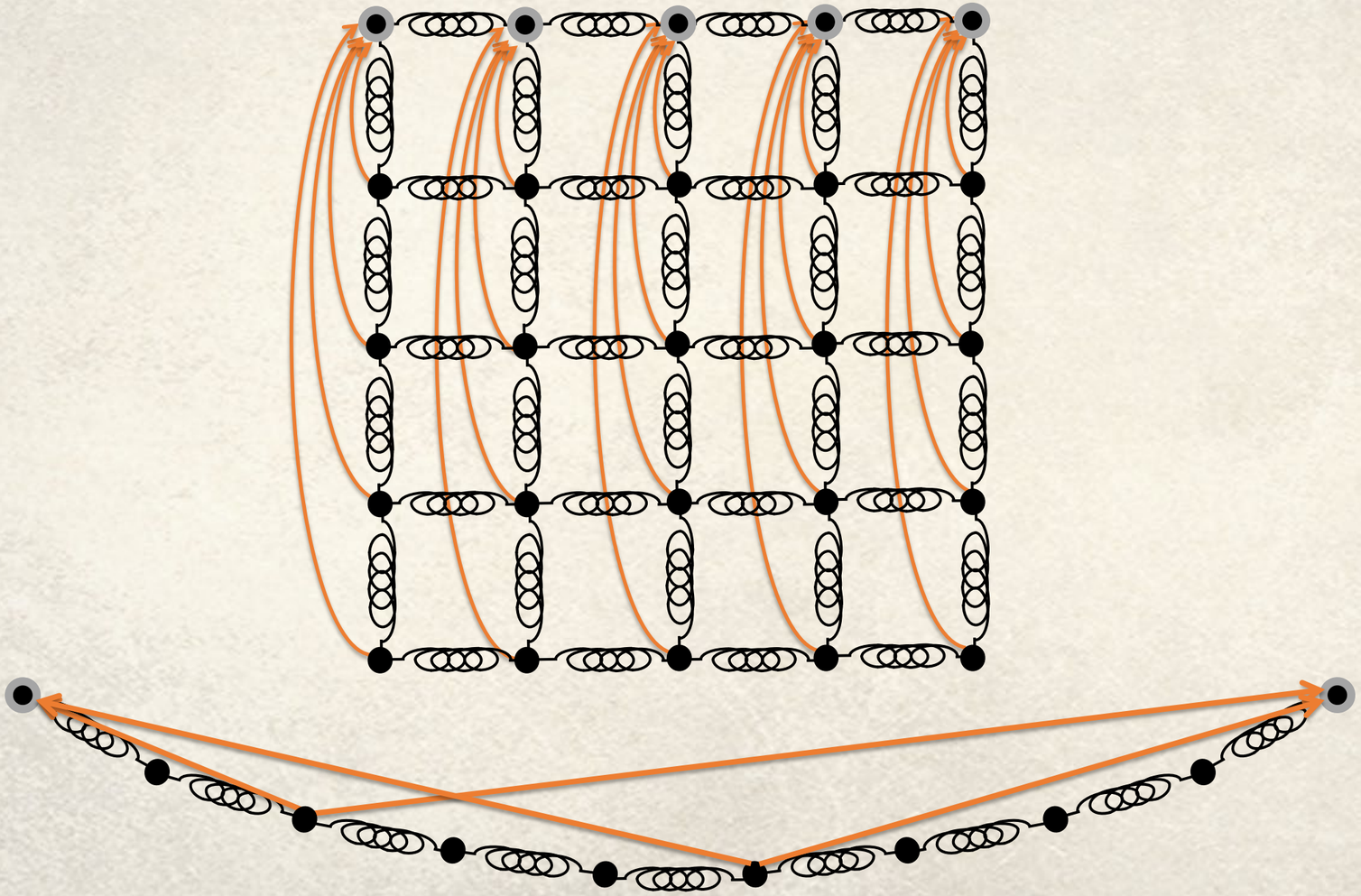


CLOTH - ANCHORS



CLOTH – ANCHORS VIDEO

CLOTH - ANCHORS



CLOTH – ANCHORS VIDEO

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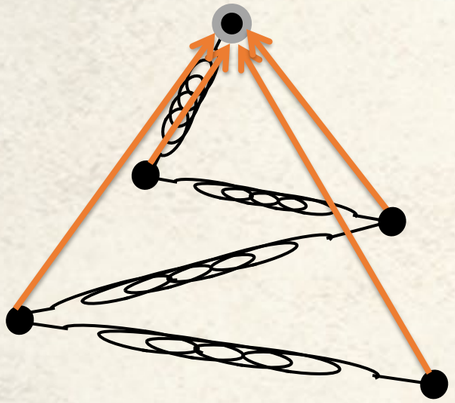
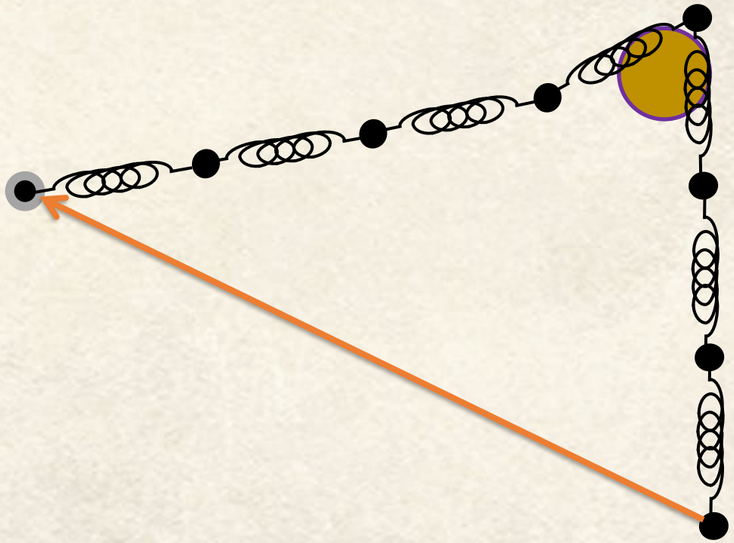
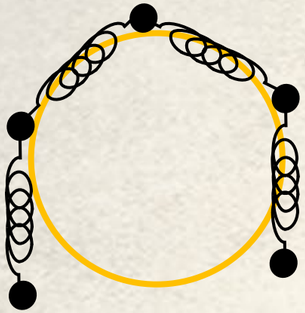
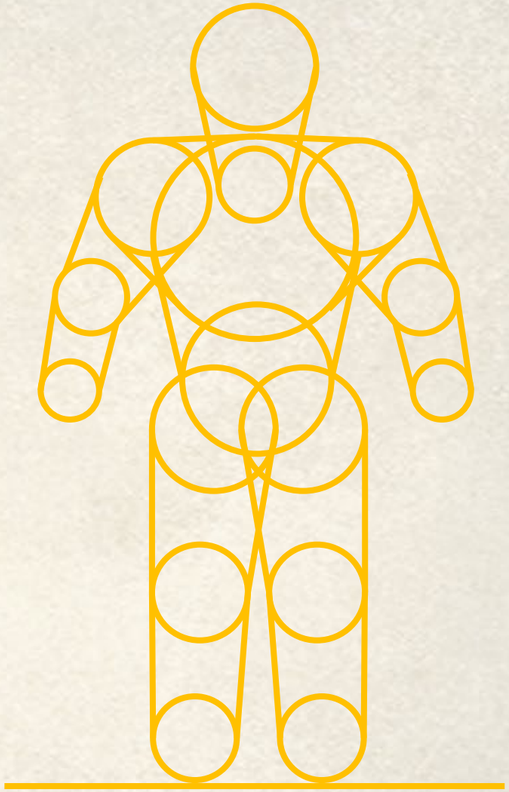




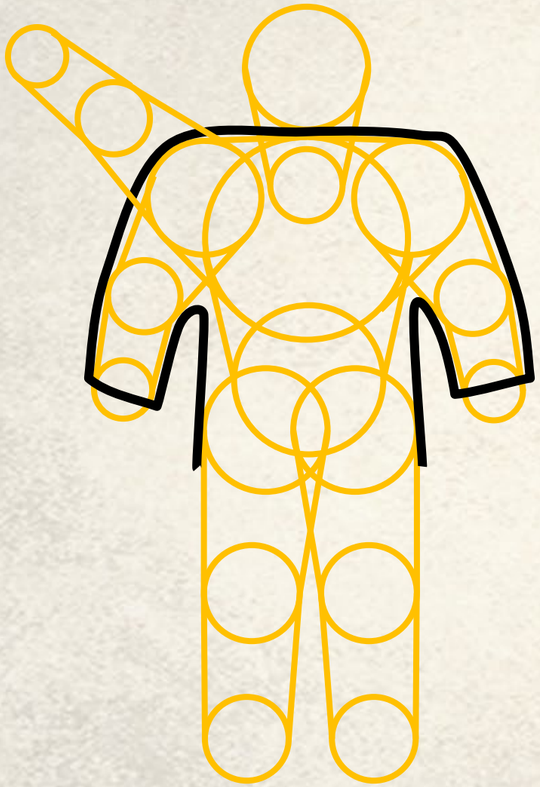
CLOTH - COLLISIONS

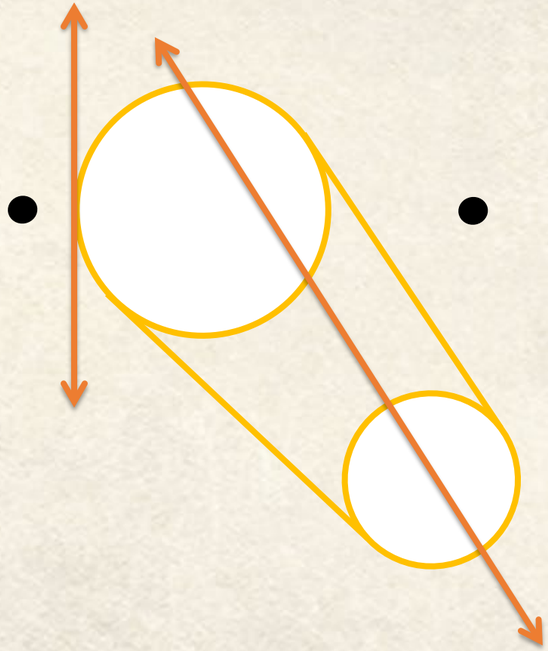




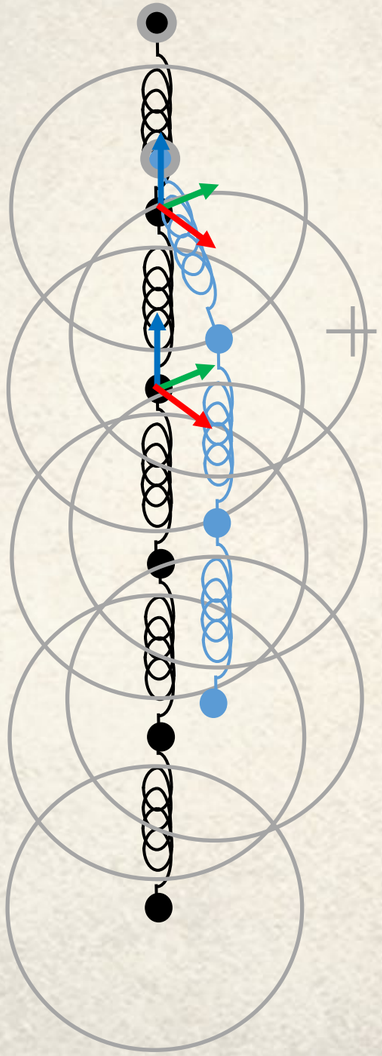
CLOTH – COLLISION VIDEO

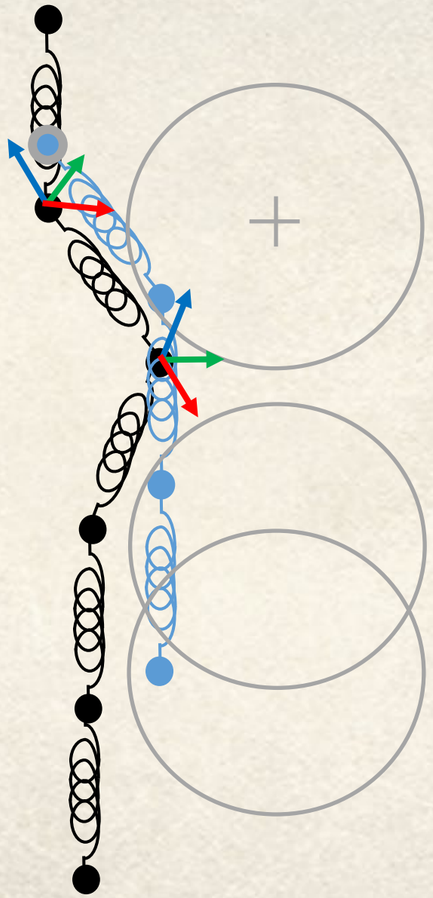
CLOTH – MAINTAINING “SIDE”





CLOTH – LAYERING





CLOTH – LAYERS VIDEO

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