Static

mass
scalar

dynamic

pos
velocity
} vectors

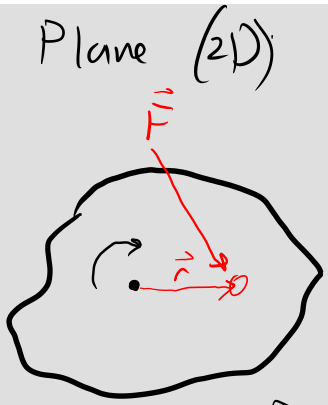
$F = ma$

$\dot{v}$ $\frac{d}{dt}v$

Dv

Δv

Plane (2D)



Static

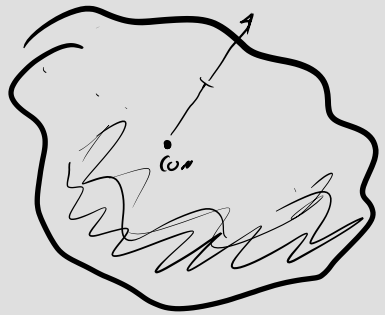
mas
CoM
shape
moment of Inertia } scalar

Dynam

pos
vel
ang. vel - ~~scalar~~
orientation - scalar

Torque $\vec{r} \times \vec{F} = \vec{\tau}$

3D



Static

Moment of Inertia - matrix

Dynami

ang. vel - vector
- axis
- mag

orientation - Quaternion

billiard balls

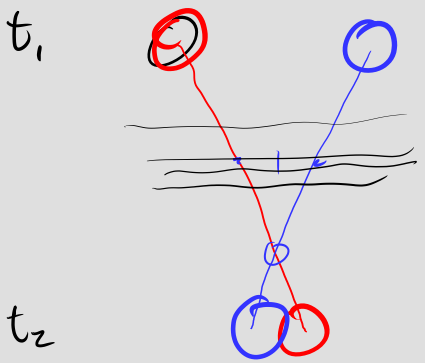
point
radius
mass
pos
vel - 2

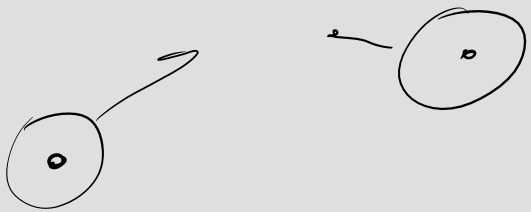
1. detect collision

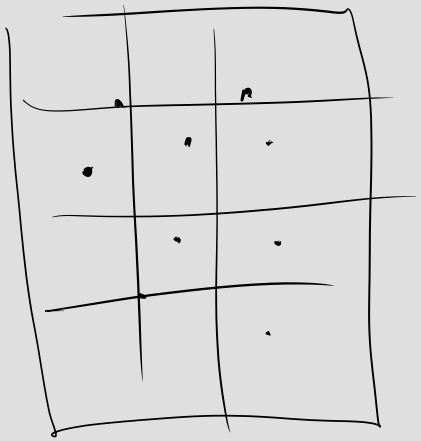
2. resolve collision

$$p = mv$$

$$E = \frac{1}{2}mv^2 \quad -1^\circ$$





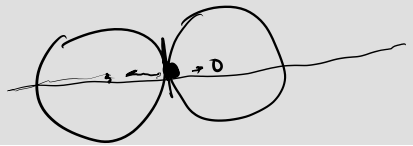


$$X_a + tV_a$$

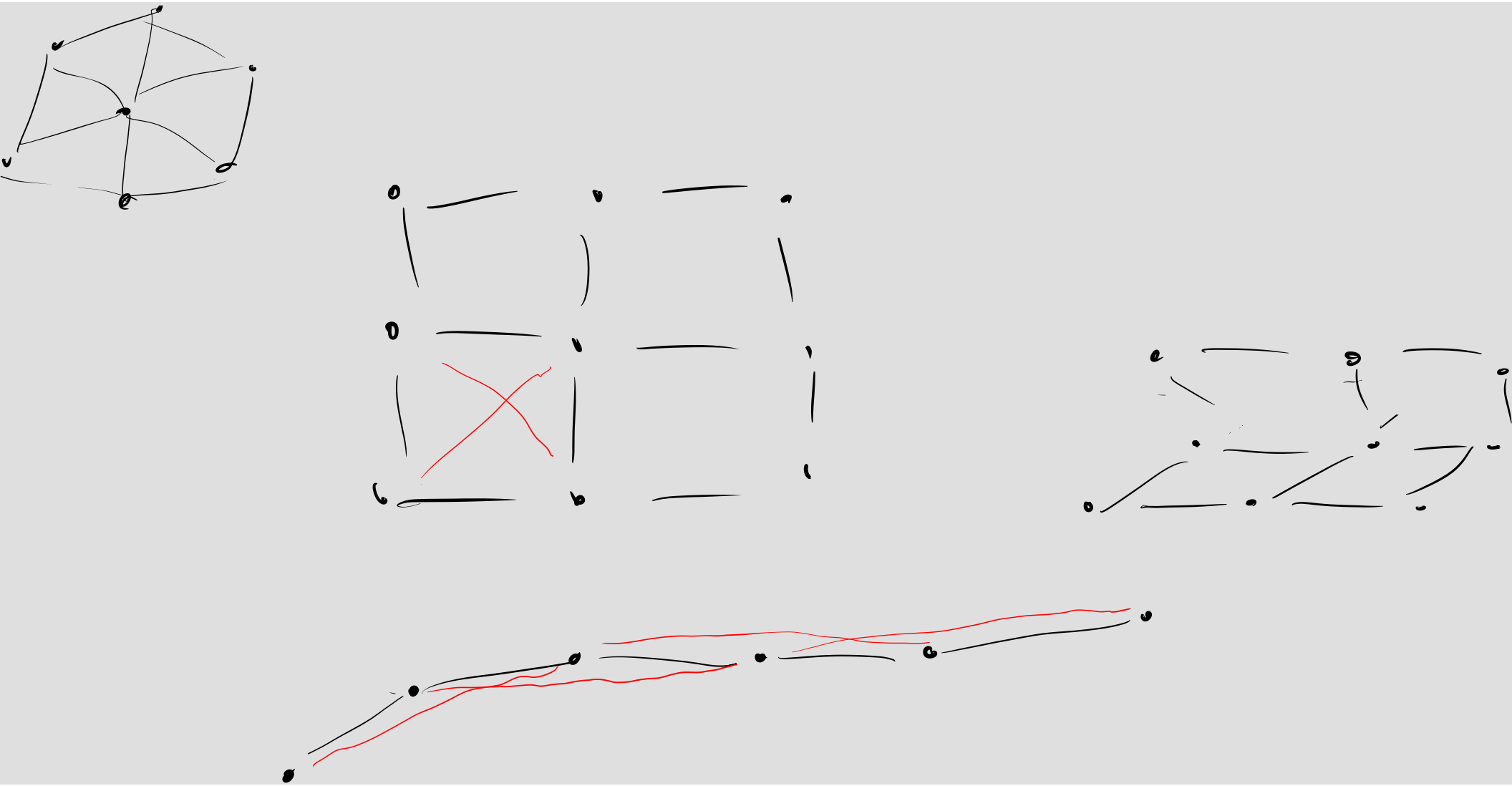
$$X_b + tV_b$$

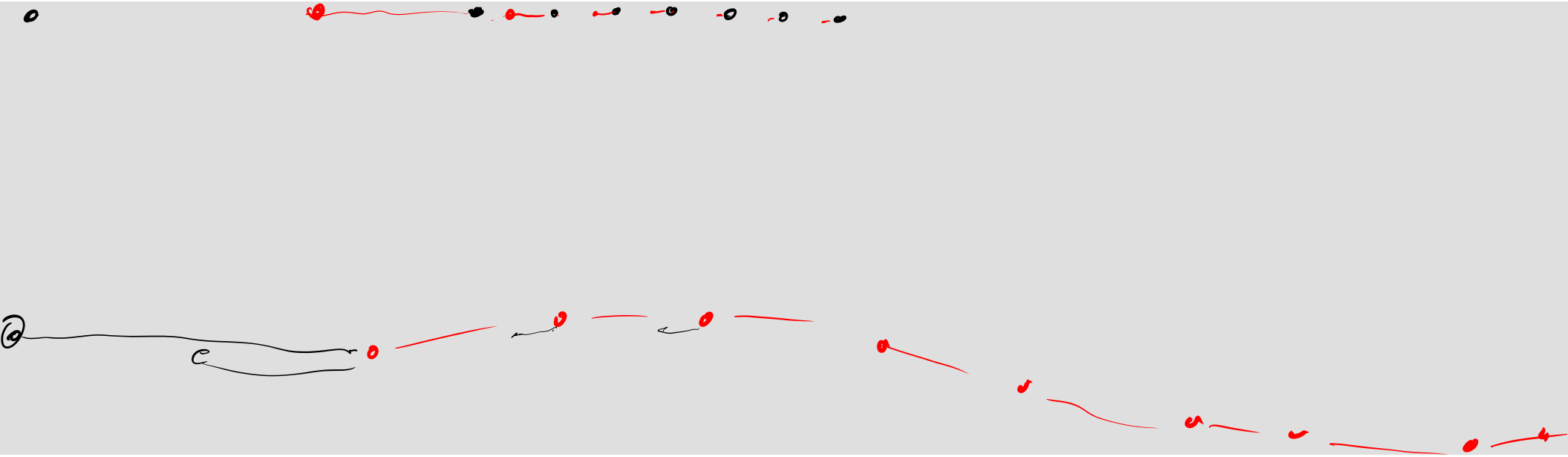
$$m_{a0}\vec{V}_{a0} + m_{b0}\vec{V}_{b0} = m_{a_1}\vec{V}_{a_1} + m_{b_1}\vec{V}_{b_1} \quad -2^\circ$$

$$\|X_a - X_b + tV_a - tV_b\| = r_a + r_b$$

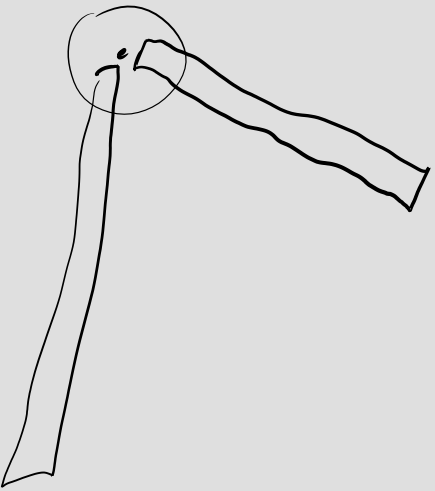


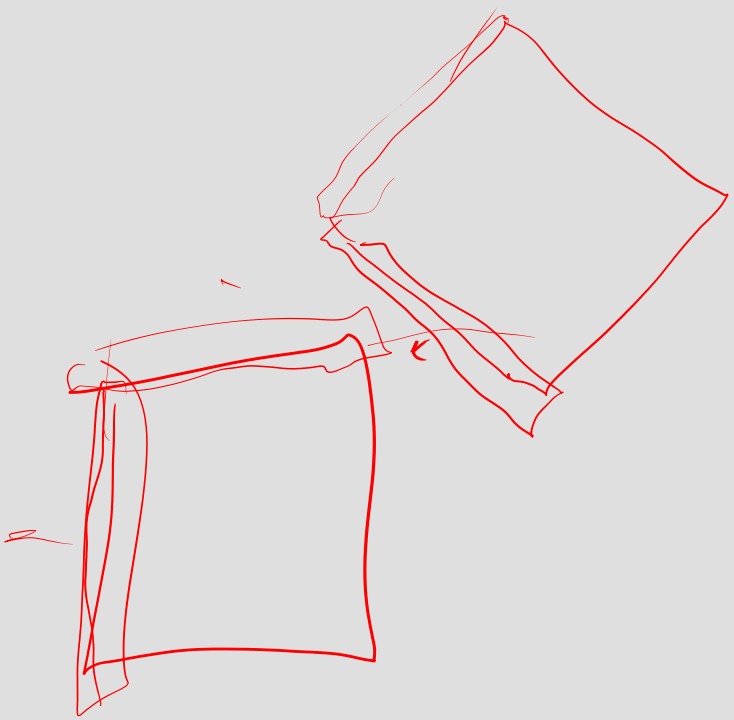
1°

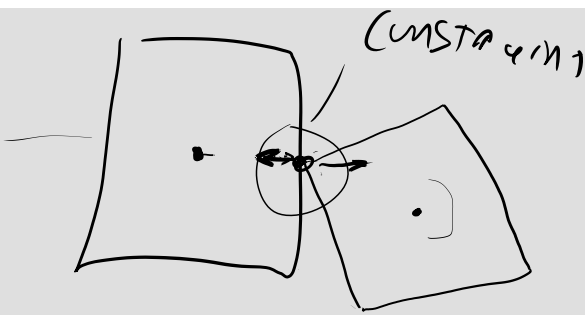


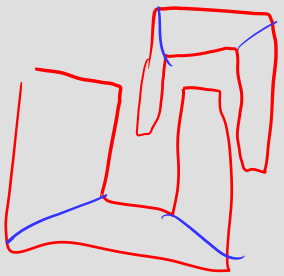


Constraint





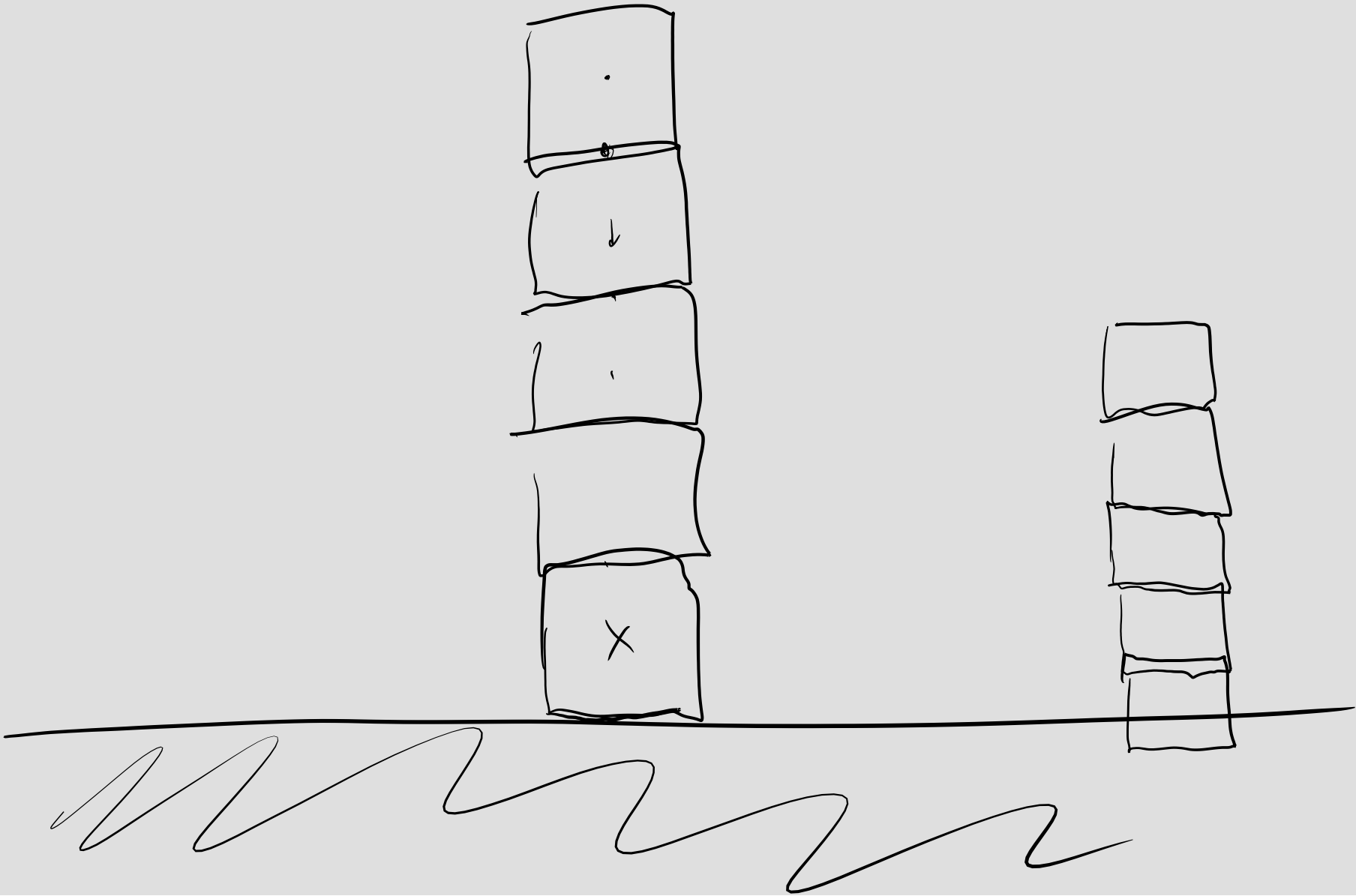




$\min \Delta E$

Sub. To

Stacking



Ragdoll Physics