Project 3: Procedural Animation - Expressions
Title: Kinetic Wave Sculpture
Name: Karol Lu
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Houdini Version: 17.0.352

Statistics
Average render time: 48.75mins/frame
Resolution: 720p
Samples: 3
Noise value: 0.01
Min/max rays: 6/12
Number of lights in scene: 2
Complexity of geometry (approximate):
Kinectic_wave: 13,002 polygons
Woodboards: 42 polygons
Envir: 224 polygons
Gear: 344 polygons
Boat: 2532 polygons

Idea/Reference:

The idea of this project is to create a kinetic wave sculpture that reference from a youtube video as shown above.

Challenge: To have the boat rotates as the waves come and go.
Description: In the reference video, the boat rotates on both X and Z axis differently while moving up and down along with the wave.

Solution:

1. Select two points(pt0 and pt1) on the wave that can refer to the rotation of the wave on Xaxis.
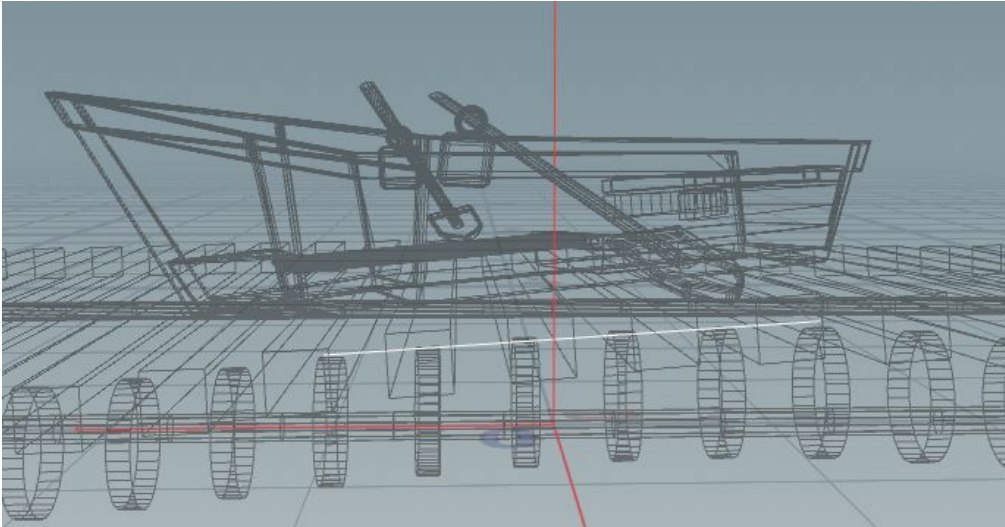
2. Getting the angle of rotation by calculating the positions of two points.
   Ps: might need to reset the position of origin.


```
VEXpression
v@Pt0 = point(0, "P", 0);
v@Pt1 = point(0, "P", 1);
v@Pt0.x = 0;
v@Pt1.x = 0;
v@myline = (v@Pt1 - v@Pt0);
v@newPt0 = v@Pt0;
v@newPt1 = v@Pt0;
v@newPt1.z += -1;
v@otherline = (v@newPt1 - v@newPt0);
@num = acos(dot(normalize(v@myline),normalize(v@otherline)));
@rotval = degrees(@num);
if (v@Pt1.y < v@Pt0.y)
    @rotval *= -1;
```

Same method apply to the rotation of Z.

Final Result: