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Period 4

Homogeneous coordinates seem to be useful in that programmers only need to rely on matrix multiplication to perform transformations. For instance, transformations like the projective transformation, which has 15 degrees of freedom can be done by one matrix multiplication with the homogeneous point. Other transformations like the rigid body, similarity, and affine transformations also seem straightforward and basically build off each other. In addition to only replying on matrix multiplication to undergo transformations, homogeneous coordinates also require relatively basic math to determine things like whether a line goes in between two points. In 2D, we can use Cramer’s Rule to calculate the intersection of two lines and the dot product to determine whether a point is on a line or not. In 3D, we can also use determine whether a point is on a plane using the scalar product. It felt like a nostalgic throwback to Math 4 and 5.

However, I think something that is just as interesting if not more useful is that expressing a point that is an infinite distance away from the origin is very simple. All you need to do is give the point a weight of 0 and give its other coordinates a nonzero value. This gets rid of needing to use unreal or undefined numbers, such as giving an arbitrarily large positive or negative value for the x, y, and z coordinates. I think that will make working on computer graphics easier to create if you use homogeneous coordinates. I noticed that some of the comments on the YouTube video lecture came from college students who were studying animation, so it was interesting to see how computer science was used in a field that was traditionally considered to be a part of the humanities.