Andrew Seba  
MATH/PHYS191  
4/2/2016

Closest Point Lab

# Introduction:

Closest point functions for vectors can be used in many ways, in the prelab we calculated the closest point on a moving object’s trajectory this can be used for AI so that the ship or enemy AI can decide on what to do next. Or the closest point on a plane between a vector and a plane can tell us later what angle we are hitting objects at and how much rotational force is being applied.

# Methods:

One of the newest additions to our vector class is a cross product between two vectors to get the normal vector of the two vectors that we are using to project onto, using this algebra we can get the cross product:

The elements are the normal vector we can use to supply a direction to the planes in our lab.

To get the closest point to a plane we got the normal to the plane and project the vector of the object we need to find the closest point minus one of our points on the plane then subtract the object we are finding the closest point to.

# Conclusion:

This simplifies things for later so we can just call closest points to lines and planes to speed things up. This function will be used a lot later in AI solutions and physics collisions.

# Post Lab:

1. We could just limit the x, y, z to some vertices or we could limit it to a certain distance from the vertices origin.