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Introduction:

In order to calculate the direction of lines, there are several different ways with which to calculate this. The importance of this might range from calculating the path at which something might collide, to just the simple direction and angles an object might travel.

Methods:

The main direction in establishing such a system is by knowing the equations and how to form them. However, understanding the equations themselves is not enough as some coding causes some needed changes to the situations as it processes everything in a step by step (more broken down) manner. In this way, other than establishing common equations using the c++ program, the establishment of x, y, and z were ALWAYS established first whether given the points directly, by magnitude, heading and pitch, or even the polar system.

For the magnitude, heading, and pitch:

x = mag\*cos(pitch)\*cos(heading);

y = mag\*cos(pitch)\*sin(heading);

z = mag\*sin(pitch);

For the polar system:

x = mag\*cos(degrees);

y = mag\*sin(degrees);

Naturally the given coordinates were just a replacement from input to actual class variables:

x = setX;

y = setY;

z = setZ;

Results:

Some test instances and results go as follows:

Program 1:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | Y | Z | Magnitude | Heading | Pitch | Alpha | Beta | Gamma |
| 10 | 5 | 8 | 13.7477 | 0.785398 | 0.621081 | 0.756281 | 1.19856 | 0.949716 |

Program 2:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | Y | Z | Magnitude | Heading | Pitch | Alpha | Beta | Gamma |
| -3.6199 e-5 | 0 | 10 | 10 | 3.1459 | 1.5708 | 1.5708 | 1.5708 | 0 |

Conclusion:

In conclusion, this program allows for very quick and pretty efficient solving of vector equations. By organizing calculations even down to a single, simple line with few characters, this program is effective.

In a game environment, however, the calculations may be a bit too accurate for other game processes (such as moving a character to a certain position and/or exact location specified). So while the program itself is very quick, simple, and effective, the great accuracy might become a hindrance to a program tied to it with which it may not need very precise measurements.