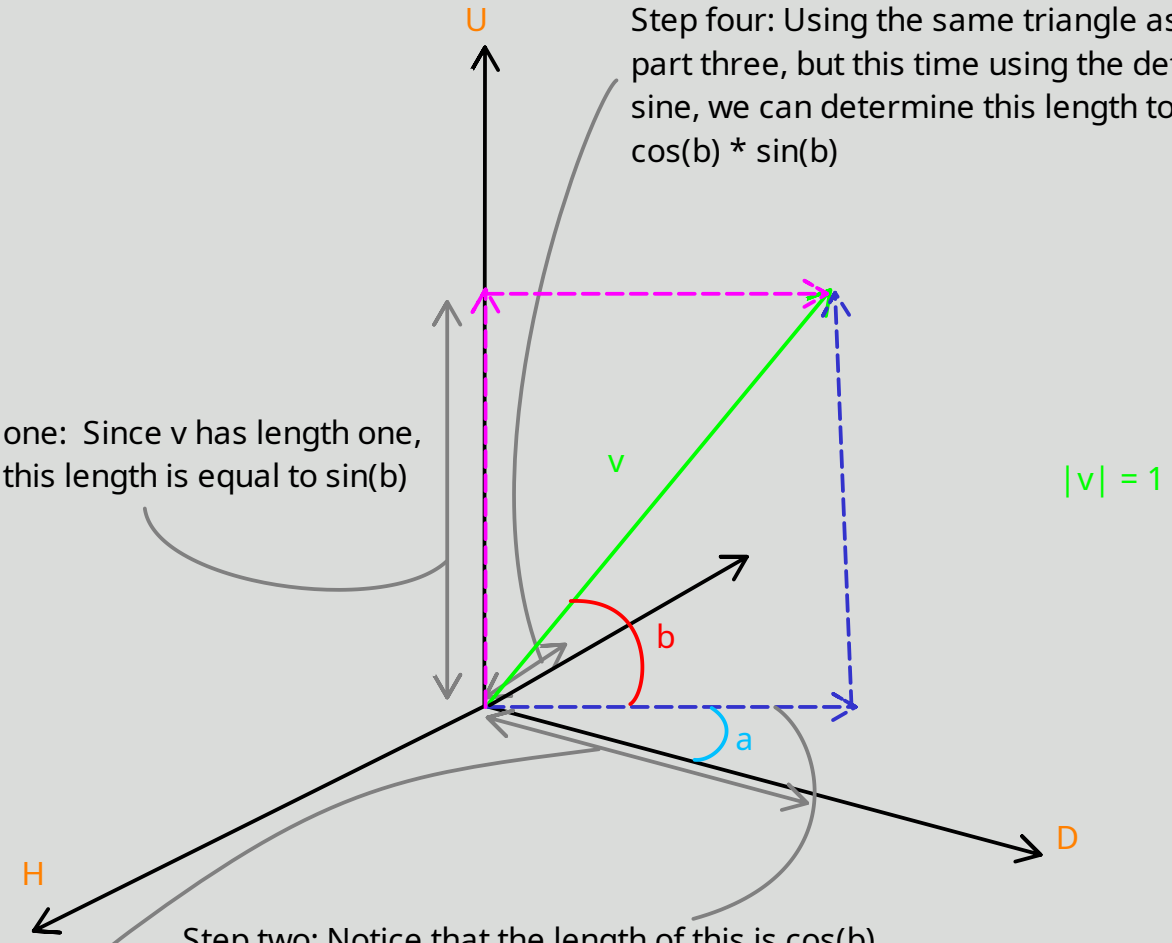
Yaw and Pitch to vector in R3

Depending on your use case you may define the x, y, z in a different way, so I have not included them in this diagram, instead we have up, horizontal and depth, bind them accordingly to your use case.

Trig function definitions:

sin(theta) = opp/hyp <=> sin(theta) * hyp = opp
cos(theta) = adj/hyp <=> cos(theta) * hyp = adj



Step four: Using the same triangle as in part three, but this time using the definition of sine, we can determine this length to be cos(b) * sin(b)

Step one: Since v has length one, then this length is equal to sin(b)

Step two: Notice that the length of this is cos(b)

Step three: This is the length of the adjacent side of a right angle triangle created with angle a and the line in the previous step, the hypotenuse of this triangle is equal to cos(b), thus by the definition of cosine, we can see that this length is cos(b) * cos(a)

Thus, we conclude that the vector representing this yaw, pitch pair is given by an up magnitude of sin(b) a depth of cos(b) * cos(a), and a horizontal magnitude of cos(b) * sin(a)

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If you want to improve this diagram you can by visiting the source code of the website