

cs805 Assignment 1

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Abstract

This assignment is written in literate programming style, generated by noweb, and rendered by LaTeX.

1 Question 1

Let n be a 3 tuple vector, and given that it is along $V1$. It is trivial that we can imply:

$$n = \frac{V1}{[|V1|, |V1|, |V1|]}$$

where $|V1| = \sqrt{V1_x^2 + V1_y^2 + V1_z^2}$

Thus n is now known.

By the definition of cross product, denoted as \times here, knowing that $V1$ and $V2$ is non-collinear, we can also derive:

$$u = \frac{V2 \times V3}{[|V2 \times V3|, |V2 \times V3|, |V2 \times V3|]}$$

Finally, it is also trivial that:

$$v = u \times n$$

Thus, we now have u, v, n as:

$$n = \begin{bmatrix} \frac{V1_x}{\sqrt{V1_x^2 + V1_y^2 + V1_z^2}} & \frac{V1_y}{\sqrt{V1_x^2 + V1_y^2 + V1_z^2}} & \frac{V1_z}{\sqrt{V1_x^2 + V1_y^2 + V1_z^2}} \end{bmatrix}$$

$$u = \begin{bmatrix} a & b & c \end{bmatrix}$$

$$v = \begin{bmatrix} a & b & c \end{bmatrix}$$