

CROSS PRODUCT

1. Let \vec{u} be an ordinary vector in \mathbb{R}^3 , so that

$$\vec{u} = u_x \hat{x} + u_y \hat{y} + u_z \hat{z}$$

for some unknown constants u_x , u_y , and u_z . Find two vectors \vec{v} and \vec{w} such that

$$\vec{u} = \vec{v} \times \vec{w}$$

It is possible to solve this problem by brute force; find a better way if you can.

HINT: What properties should \vec{v} and \vec{w} have?

NOTATION:

- u_x , u_y , u_z are *not* partial derivatives;
- \hat{x} , \hat{y} , \hat{z} are the standard basis vectors in \mathbb{R}^3 , also written as \hat{i} , \hat{j} , \hat{k} .