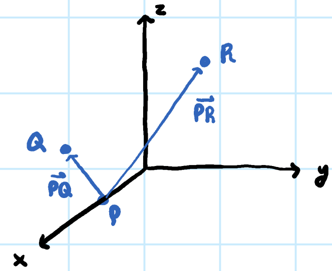
Final Review: Part 2

Monday, June 5, 2023 9:34 AM

vectors: $P = (1,0,0)$, $Q = (1,-1,0)$, $R = (2,2,3)$



- $\vec{u} = \vec{PQ} = \langle 0,-1,0 \rangle$, $\vec{v} = \vec{PR} = \langle 1,2,3 \rangle$
  - $|\vec{u}|$, $|\vec{v}| = \sqrt{1^2+2^2+3^2} = \sqrt{14}$

(I) - $\vec{u}\cdot\vec{v} = 0-2+0 = -2$

(II) - $\vec{u}\times\vec{v} = \begin{vmatrix} i & j & k \\ 0 & -1 & 0 \\ 1 & 2 & 3 \end{vmatrix} = \langle -3, 0, 1 \rangle$

know how to compute

uses & applications (of $\vec{u}\cdot\vec{v}$, $\vec{u}\times\vec{v}$):

- parallel → $\vec{u}\times\vec{v} = \vec{0}$ / perpendicular → $\vec{u}\cdot\vec{v} = 0$
  (or see if multiples)
- find equation for plane spanned by $\vec{u}$ & $\vec{v}$ ⟶ $(a,b,c) = \vec{u}\times\vec{v}$ / d from point
- angle formulas : $\vec{u}\cdot\vec{v} = |\vec{u}|\cdot|\vec{v}|\cos\theta$ / $|\vec{u}\times\vec{v}|$ = area of parallelogram
- distances : point to → plane (dot product)
  → line (cross product)