

10/3/19 - J

2D  $z = x + iy$

rot by  $\theta \equiv x e^{i\theta}$

3D  $q = a\underline{i} + b\underline{j} + c\underline{k}$

$i^2 = j^2 = k^2 = -1$

$ij = k \quad jk = -i$

$ji = -k \quad ki = j$

$ik = -j \quad kj = i$

$(x, y, z) = x\underline{i} + y\underline{j} + z\underline{k}$

ROT BY  $\theta$  ABOUT AXIS  $a_x \underline{i} + a_y \underline{j} + a_z \underline{k}$   
 $q = \cos \frac{\theta}{2} + \sin \frac{\theta}{2} (a_x \underline{i} + a_y \underline{j} + a_z \underline{k})$

$P' = q P q^*$

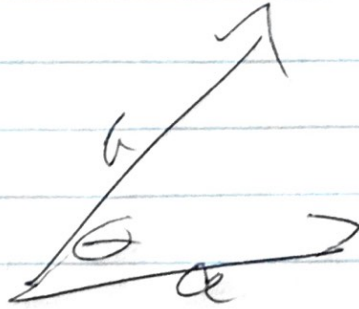
$\underbrace{q_2 q_1 P q_1^* q_2^*}_q$

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$$A = (1 \ 0)$$

$$B = (1 \ 2 \ 3)$$

$$A \cdot B = 1$$



$$A \cdot B = |A| |B| \cos \theta$$

$$1 = 1 \sqrt{14}$$

$$\cos \theta = \frac{1}{\sqrt{14}}$$