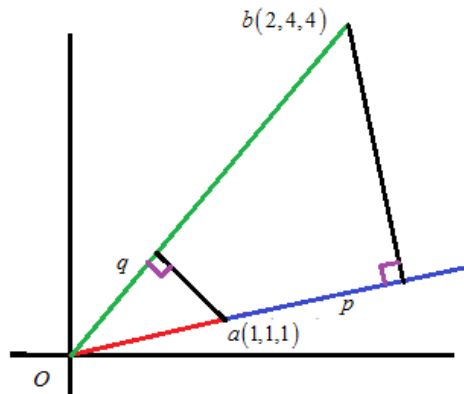


Step-1



Step-2

The vector p is the projection of b upon a .

So, the length of p is the part of $a(1,1,1)$ closest the vector b .

We know that the projection p is given by $\frac{a^T b}{a^T a} a$

$$p = \frac{(1,1,1) \begin{pmatrix} 2 \\ 4 \\ 4 \end{pmatrix}}{(1,1,1) \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}} (1,1,1)$$

$$= \frac{2+4+4}{1+1+1} (1,1,1)$$

$$= \frac{10}{3} (1,1,1)$$

So, the projection of b upon a is bigger than the length of a by $10/3$ times.

The nearest point is $\left(\frac{10}{3}, \frac{10}{3}, \frac{10}{3} \right)$

Step-3

Similarly, q is the projection of a upon b is given by $\frac{b^T a}{b^T b} b$

$$q = \frac{(2, 4, 4) \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}}{(2, 4, 4) \begin{pmatrix} 2 \\ 4 \\ 4 \end{pmatrix}} (2, 4, 4)$$

$$= \frac{2+4+4}{4+16+16} (2, 4, 4)$$

$$= \frac{5}{18} (2, 4, 4)$$

So, the nearest part of a to the part of b is $5/18^{\text{th}}$ part of b .

The nearest point is $\boxed{\left(\frac{5}{9}, \frac{10}{9}, \frac{10}{9}\right)}$

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