Projection onto a 1-dimensional subspace

1.Question 1

Compute the projection matrix that allows us to project any vector $x \in R^3$ onto the subspace spanned by the basis vector

b=[1 2 2]

Do the exercise using pen and paper. You can use the formula slide that comes with the corresponding lecture.

2 / 2 points

- ○ [1 / 9]
- ◉ 1 / 9[[1 2 2], [2 4 4], [2 4 4]]
- ○ [1 2 2], [2 4 4], [2 4 4]

2.Question 2

Given the projection matrix

1 / 25[[9 0 12], [0 0 0], [12 0 16]]

project [1 1 1] onto the corresponding subspace, which is spanned by b=[3 0 4].

Do the exercise using pen and paper.

2 / 2 points

- ○ 1 / 25[5 10 10]
- ○ [3 0 4]
- ○ [21 0 28]
- ○ 1 / 25[21 0 28]

3.Question 3

Now, we compute the reconstruction error**, i.e., the distance between the original data point and its projection onto a lower-dimensional subspace.**

Assume our original data point is

$[1\ 1\ 1]$ and its projection $1 / 9\ [5\ 10\ 10]$. What is the reconstruction error?

1 / 1 point

0.47