Projection onto a 1-dimensional subspace

LATEST SUBMISSION GRADE
100%

1. Compute the projection matrix that allows us to project any vector $\mathbf{x} \in \mathbb{R}^3$ onto the subspace spanned by the basis vector $\mathbf{b} = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix}$. **2 / 2 points**

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

- $\begin{bmatrix} \frac{1}{9} \end{bmatrix}$
- (selected) $\frac{1}{9}\begin{bmatrix} 1 & 2 & 2 \\ 2 & 4 & 4 \\ 2 & 4 & 4 \end{bmatrix}$
- $\begin{bmatrix} 1 & 2 & 2 \\ 2 & 4 & 4 \\ 2 & 4 & 4 \end{bmatrix}$

Correct
Well done!

Correct
Good job!

3. Now, we compute the **reconstruction error**, i.e., the distance between the original data point and its projection onto a lower-dimensional subspace. **1 / 1 point**

Assume our original data point is $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ and its projection $\frac{1}{9}\begin{bmatrix} 5 \\ 10 \\ 10 \end{bmatrix}$. What is the reconstruction error?

0.47

Correct
Well done!