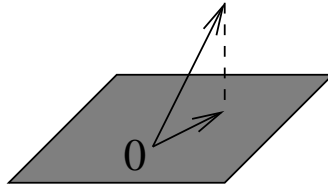


1. Let  $A$  be the matrix of a linear transformation  $\mathbf{R}^3 \rightarrow \mathbf{R}^3$  that is the orthogonal projection onto a plane in  $\mathbf{R}^3$ . Find the rank of  $A$ .

**Solution.** The rank of  $A$  is equal to the dimension of the image of  $A$ . The image of the orthogonal projection onto a plane is the plane.



Therefore, the rank of  $A$  is equal to the dimension of the plane, which is 2.

**Answer.** rank  $A = 2$ .