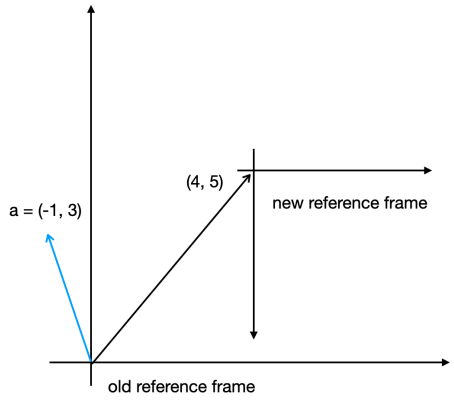
Homework 6

1. Find the transformation to the new reference frame and the coordinates of the vector **a** in its basis represented by vectors **u** = (0, -0.01) and **v** = (0.01, 0), if the origin of the new reference frame is displaced as shown in the picture.



2. Find the affine transformation (affine matrix) if we know that it transforms vectors as shown bellow:

   a = (1, 2) —> a’ = (9, 15)

   b = (2, 1) —> b’ = (8, 14)

   c = (3, 3) —> c’ = (16, 28)

3. Find the projection of a vector b = (3, 3, 3) onto the plane x + 2z = y. What is the projection matrix?

4. Optional.

   Normalize the given images so the size of any image will be 128 by 128 pixels and cat’s eyes have coordinates (44, 64) and (84, 64) as shown in the picture. The location of the eyes in the original images are given in the cats.csv file.