Ning

24 September 2019

Data Science TP1

1. The function “deviate\_vector” relies on the other function, “project\_on\_first,” which takes the second vector given and does a projection of the vector onto the first vector given and then multiplies them together, which is how you calculate the scalar product. “deviate\_vector” itself takes the projection and subtracts it from the original vector, which is how you calculate the rejection (ar = a - a*p*). So the function calculates the rejection of the first vector given two vectors.

Each for loop can be replaced with a summation notation, and the action stored by *r* is the value that we want to sum. The mathematical equivalent will be

2. For the work relating to finding the determinant, eigenvectors, and eigenvalues of matrix *A*, please refer to the image provided (problem\_2.PNG). The values are as follows.

Determinant:

Eigenvalues:

Eigenvectors: ,

For the work relating to showing that the vectors are indeed eigenvectors, refer to image provided (problem\_2.PNG). These vectors are different than the eigenvectors found above.

For the proof relating to the *covariance matrix*, please refer to the image provided (problem\_2.PNG).

#### [...]

3. For the work relating to the distance, please refer to the file provided (*point\_projection.m* and *distance\_calc.m*). Distance is approximately .

#### [... explanation here]