



Linear Algebra

Laboratory Activity No. 3

Linear Combination and Vector Spaces

Submitted by:

Roa, Danica Kate I.

Instructor:

Engr. Dylan Josh D. Lopez

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I. Objectives

This laboratory activity aims to implement the principles and techniques of Linear Combination and Vector Spaces in two dimensional plane and representation of ranges of vectors in Python.

II. Methods

Array used to create a grid of values, of all shape, and size of the arrays along each dimension in task 1 and task 2 problem which declaring the scalar values of the vector. `plt.xlim()` is use to determine the x-axis limits and `plt.ylim()` used to determine the y-axis limits. `plt.axvline()` in both tasks was used to add a vertical line which represents as x-axis that sets the x position in the coordinates of a vertical line. `plt.axhline()`, used to add horizontal line in the axis which represents as the y axis that sets y position in the coordinates of a horizontal line . `np.meshgrid()` is used to create a rectangular grid that represente two dimensional arrays of X and coordinates of all points. To add title to the grid I used `plt. Grid` to set the visibility of the grid inside the figures .

III. Results

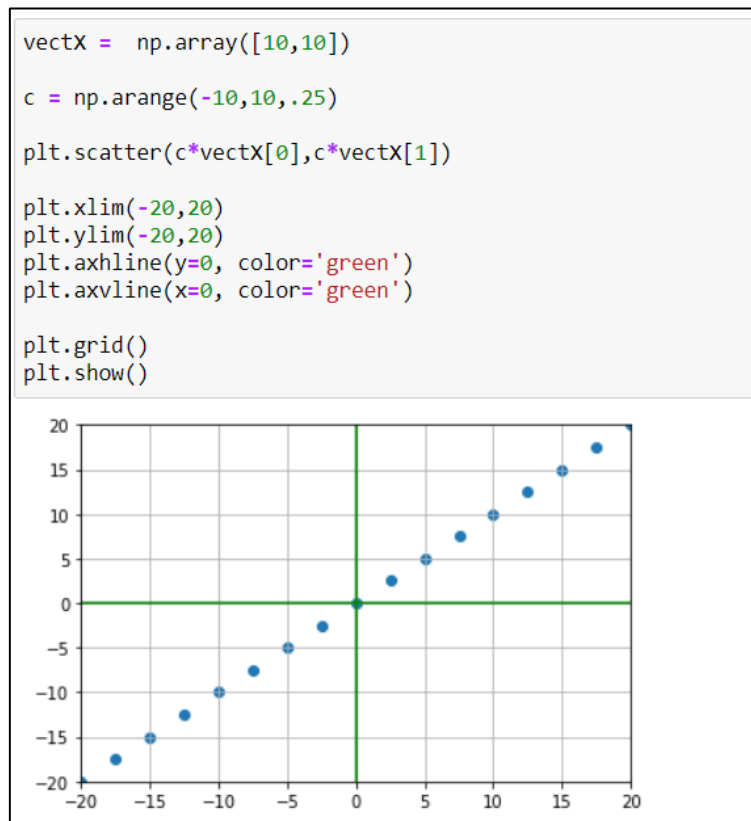


Figure 1 Task 1

In line 2, it is where to plot the vectors, in line 7 – 11 it is where the cartesian plane is being plotted and in the line 14 it is where the grid is being created and lastly `plt.show()` is used to display the outcome of the array in the program

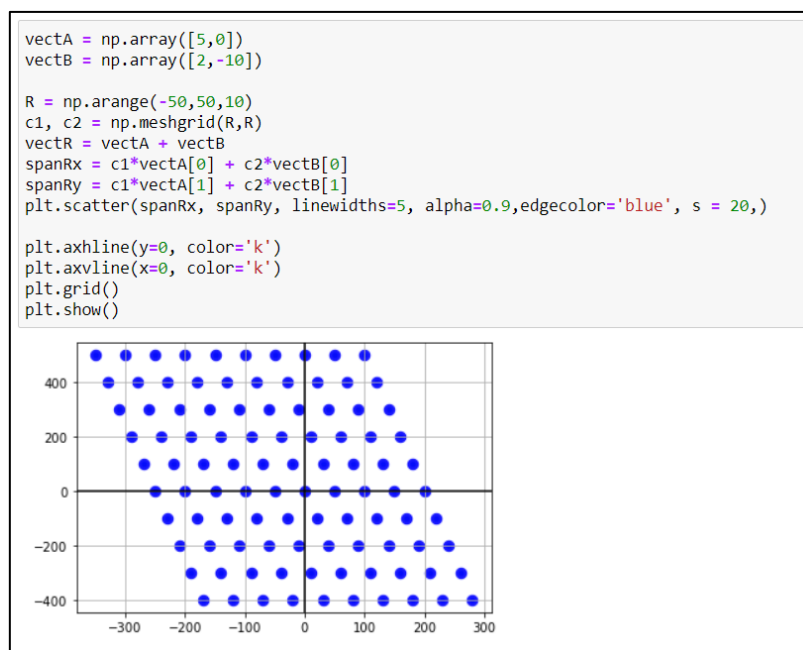


Figure 2.1 Trial 1

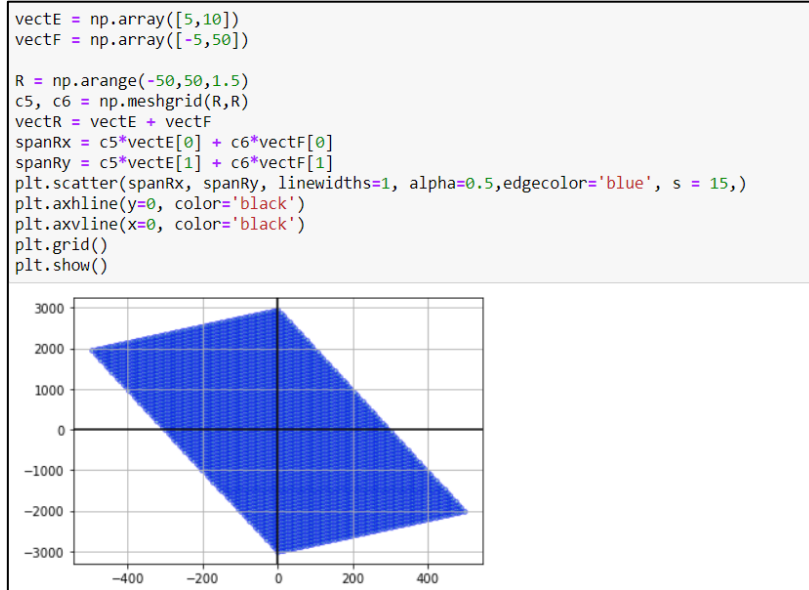


Figure 2.2 Trial 2

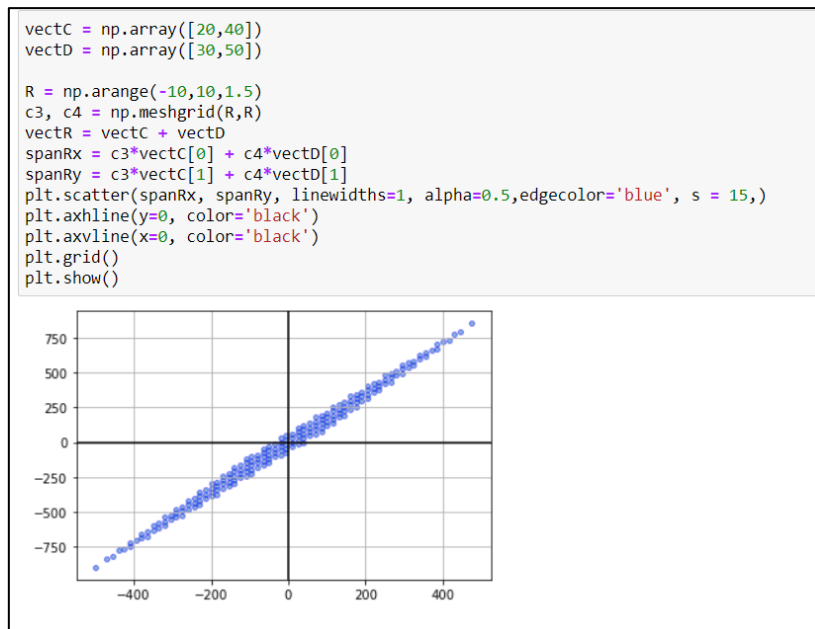


Figure 2.3 Trial 3

In figure 2.1, 2.2, 2.3 the Lines 2 and 3 is where the array for the vector is being input and in line 5 It is where the initial range of the cartesian plane, in line 6, it is where to greacte the meshgrid using np.meshgrid(), and the line 7 is where the equation is being input to get the total vector, in line 8 and 9 is getting the total span in x and y axis, lines 11 and 12 is where the cartesian planes color where you can change its figure. And lastly the plt.show() is use to print the whole program

1. You might have notices that the dimensions plot of linear combinations change according to its rank. If a vector is $\mathbb{R}=1$ the plot of its linear combination is one-dimensional or a line, and if $\mathbb{R}=2$ the plot is a plane. What will be the

shape of the vector visualization if $R=3$ and if $R=4$?

- The outcome of the vector in $R = 3$ or Rank 3 would be 3 dimensional and the second given vector $R = 4$ or Rank 4 shape would be a 4 dimensional.

2. Kindly discuss the role of unit vectors in relation to linear combinations.

-Linear combination of unit vector is the structure $v_1 \mathbf{i} + v_2 \mathbf{j}$. v_1 and v_2 are scalars and they are called even vertical segments of 'v' separately. The part of unit vectors is regularly used to furnish a bearing with a scalar coefficient. The connection of these unit vectors to direct blend is that to add and increase all the conceivable scalar with the consistent term and getting its outcome along the flat line and vertical line.

IV. Conclusion

The reach will be where the x and y esteems will be plotted and understanding the relationship of lines which in the event that one line is shown in a plot by the amount of 2 vectors it would be directly reliant importance they have similar qualities or they have similar arrangement of plotted qualities in the chart it can cover yet at the same time it show one line. I discovered that in plotting a dissipate focuses size, its murkiness, shape, reach, and steps are should have been ready to completely portray and imagine a bunch of vectors into a diagram. As I would like to think, this idea of direct blend could be applied in the feeling of plotting a bunch of vectors that finds a populace development of a bacterial how can it increase, what is the time timespan bacterial to spread quicker, and so forth Likewise, this research facility gives me another method in plotting a diagram with an alternate style of focuses which I utilized the marker to give insight regarding the point, just spot as well as it tends to be a state of a square, triangle, star and many more.

References

[1] D.J.D. Lopez. "Adamson University Computer Engineering Department Honor Code," AdU-CpE Departmental Policies, 2020.