

Computer Lab Portfolio

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1 Week 2 - Introduction to data visualisation in MATLAB Part 1

1.1 Task 1

Question: A TIFF file with the two-panel Mauna Loa CO2 graph

Answer: Tiff image is in the appropriately label week in the code folder.

1.2 Task 2

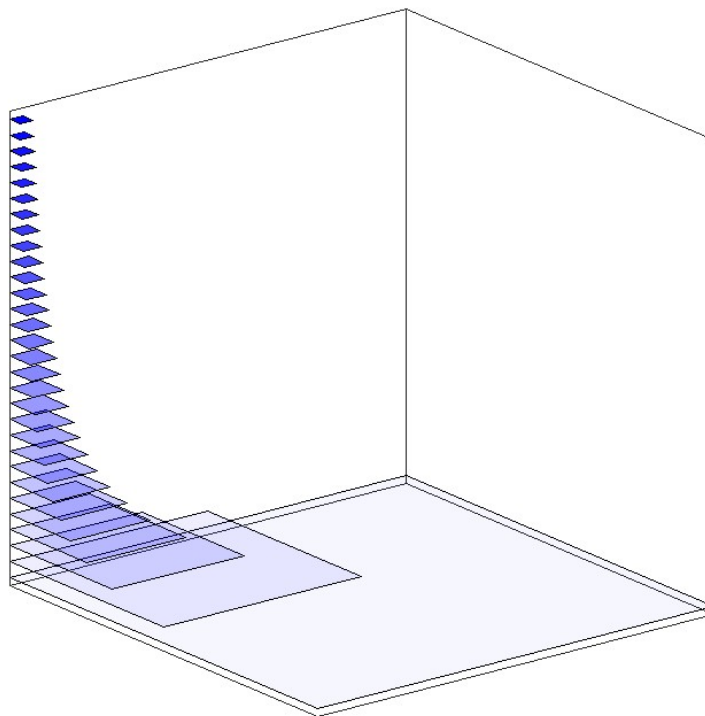
Question: A vector graphics file of your GBRMPA plot (e.g., EPS, SVG, PDF, etc).

Answer: I did this as a SVG and couldnt find a way to show an svg through LaTeX. The file is in the appropriately label week in the code folder.

1.3 Task 3

Question: A JPG file of the stack of squares in 3D, with twice as many squares in the stack

Answer:

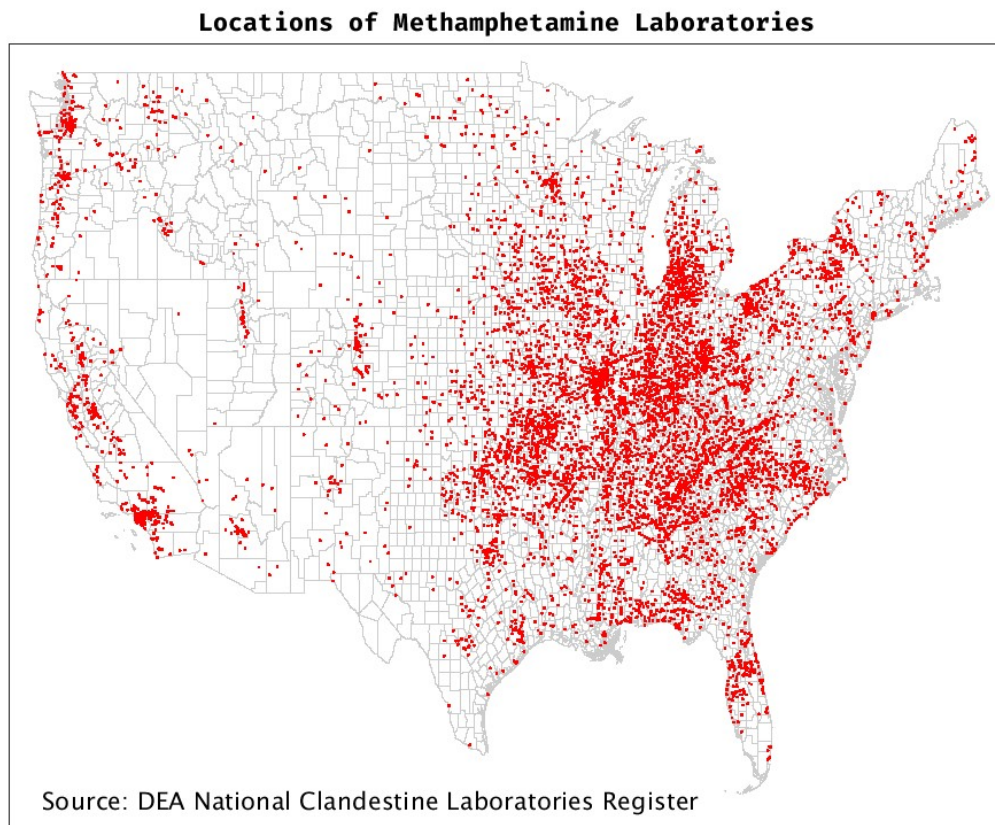


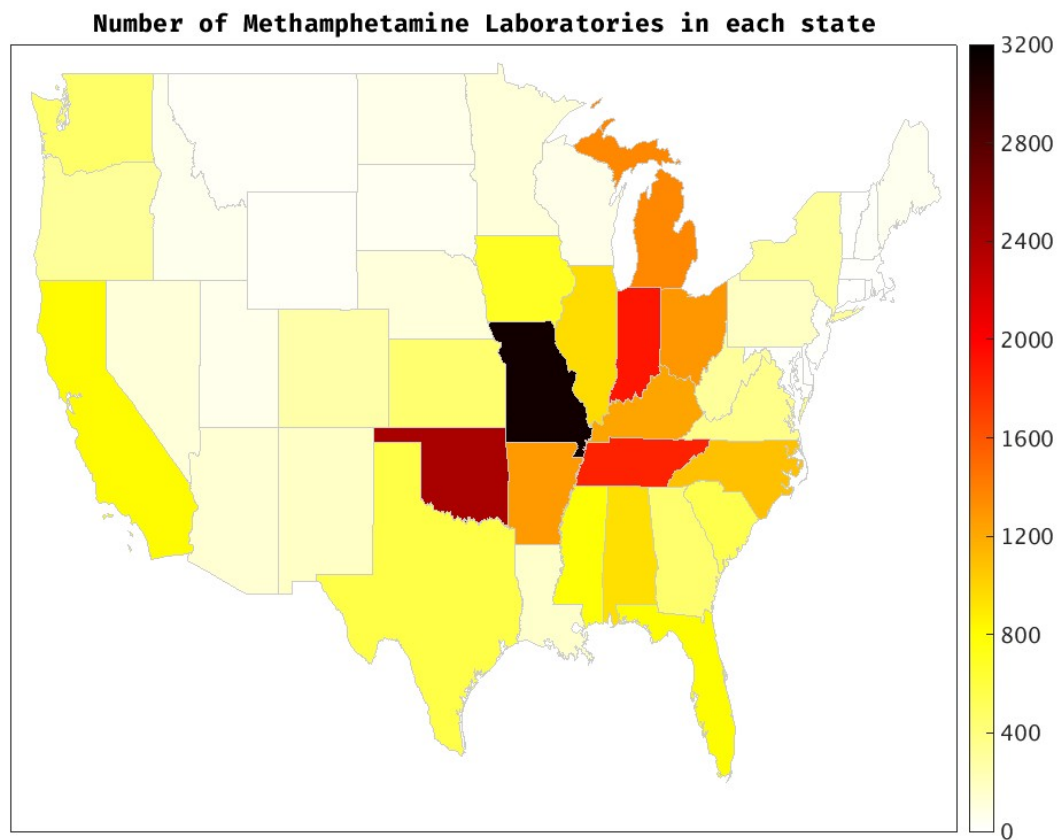
2 Week 3 - Introduction to data visualisation in MATLAB Part 2

2.1 Task 1

Question: Image files (e.g., TIFF, EPS, JPEG) showing (1) a scatter plot of methamphetamine laboratory locations superimposed on the contiguous US counties, and (2) a colour-coded map showing the relative density of methamphetamine labs in each contiguous US state. Ensure you include axes labels, title, appropriate fontsize, etc.

Answer:

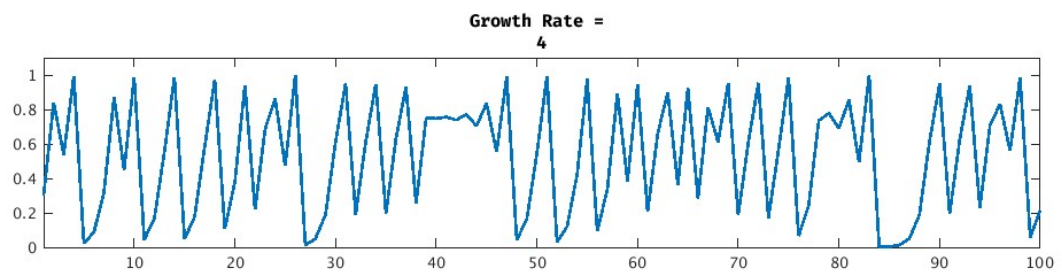
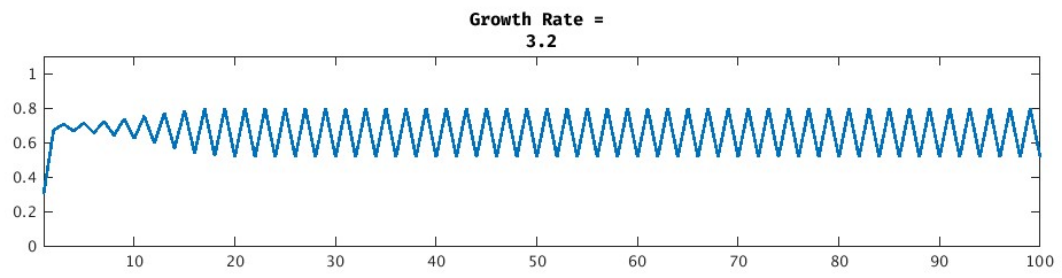
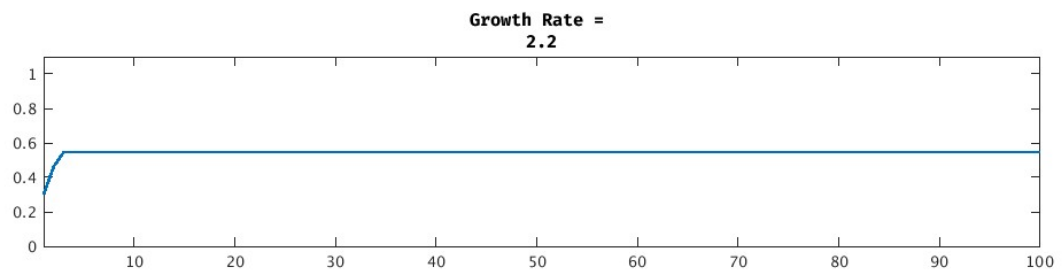


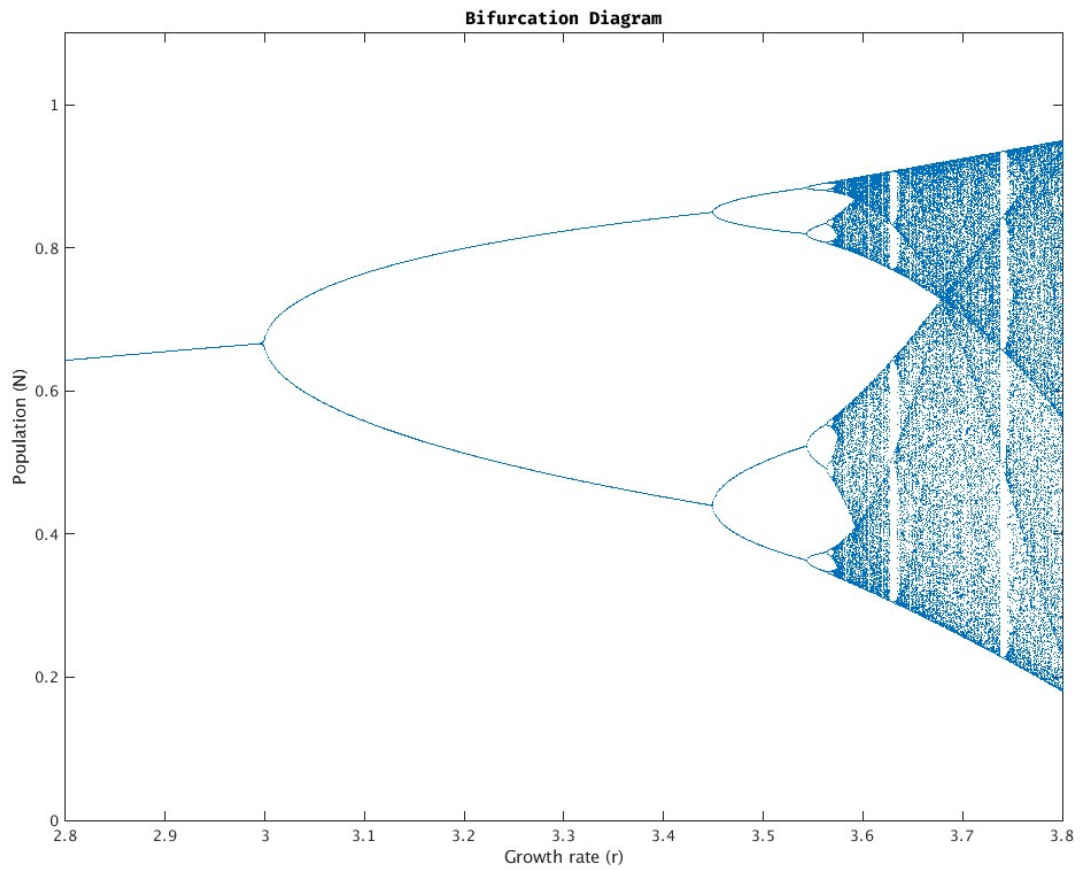


2.2 Task 2

Question: An image file showing the timeseries of the logistic mapping N_t , and also the bifurcation diagram for values of r between 2.6 and 3.8.

Answer:

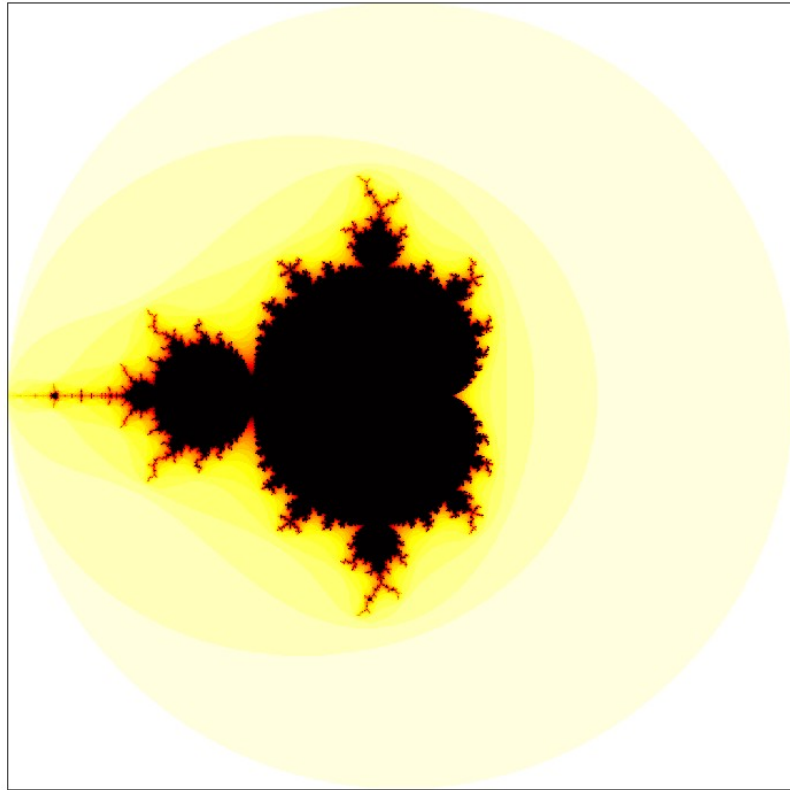


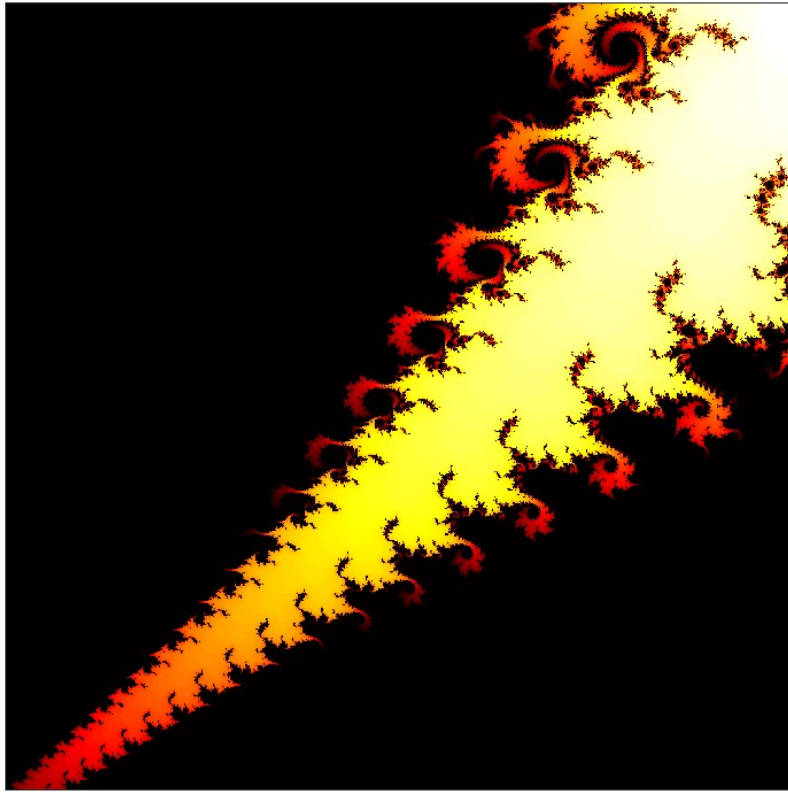


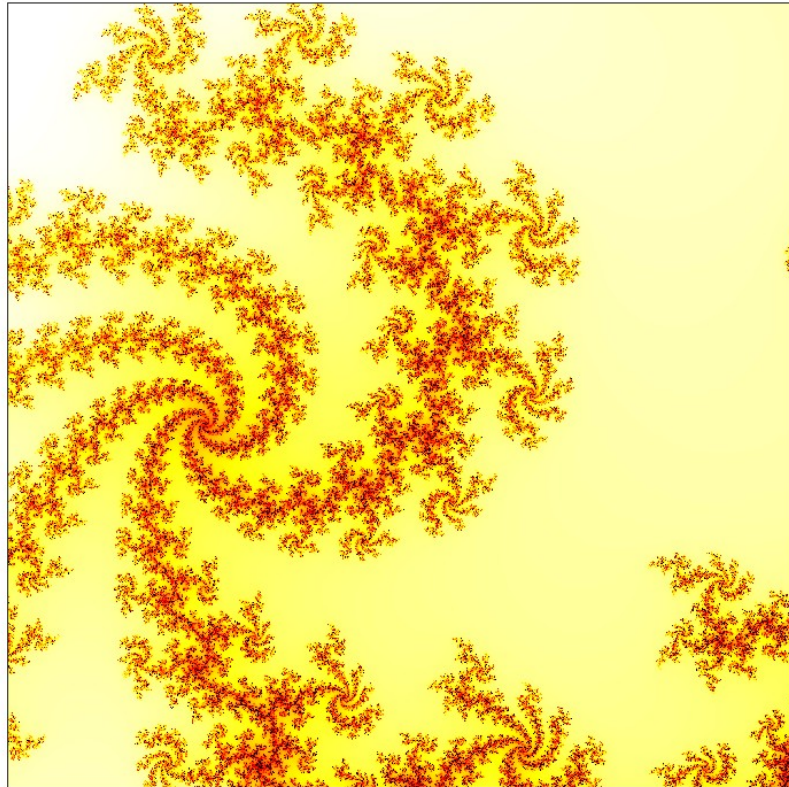
2.3 Task 3

Question: An image of the entire Mandelbrot set, and two other images, focused on different areas.

Answer:







3 Week 5 - Animation in Matlab

3.1 Task 1

Question: Produce the London population animation including all time-periods in the dataset. The resulting animation, as an MPEG-4 file, should be included in the portfolio.

Answer: I was unable to use MPEG-4 as MATLAB on Linux it is unsupported and not available, I have added it as an AVI file, which should still be accessible in most software. The file is in the appropriately label week in the code folder.

3.2 Task 2

Question: Produce the pendulum animation. The resulting animation, as a GIF file, should be included in the portfolio.

Answer: I couldnt find a way to show an GIF through LaTeX. The file is in the appropriately label week in the code folder.

4 Week 6/8 - Volume visualisation algorithms

4.1 Tasks 1-4 (R Code)

Uncomplete, was unabel to get this working.

4.2 Tasks 1 (MATLAB Code)

Question: A coloured isosurface of the stag beetle with an appropriately chosen ISOVALUE and viewing angle that produce a clear volume visualisation.

Answer:



5 Week 9 - Visualising uncertainty

5.1 Task 1 (MATLAB Code)

Question: Animation of uncertainty surrounding larval cloud through time. Does not need to be a convex hull.

Answer: I couldnt find a way to show an GIF through LaTeX. The file is in the appropriately label week in the code folder.

5.2 Task 1 (R Code)

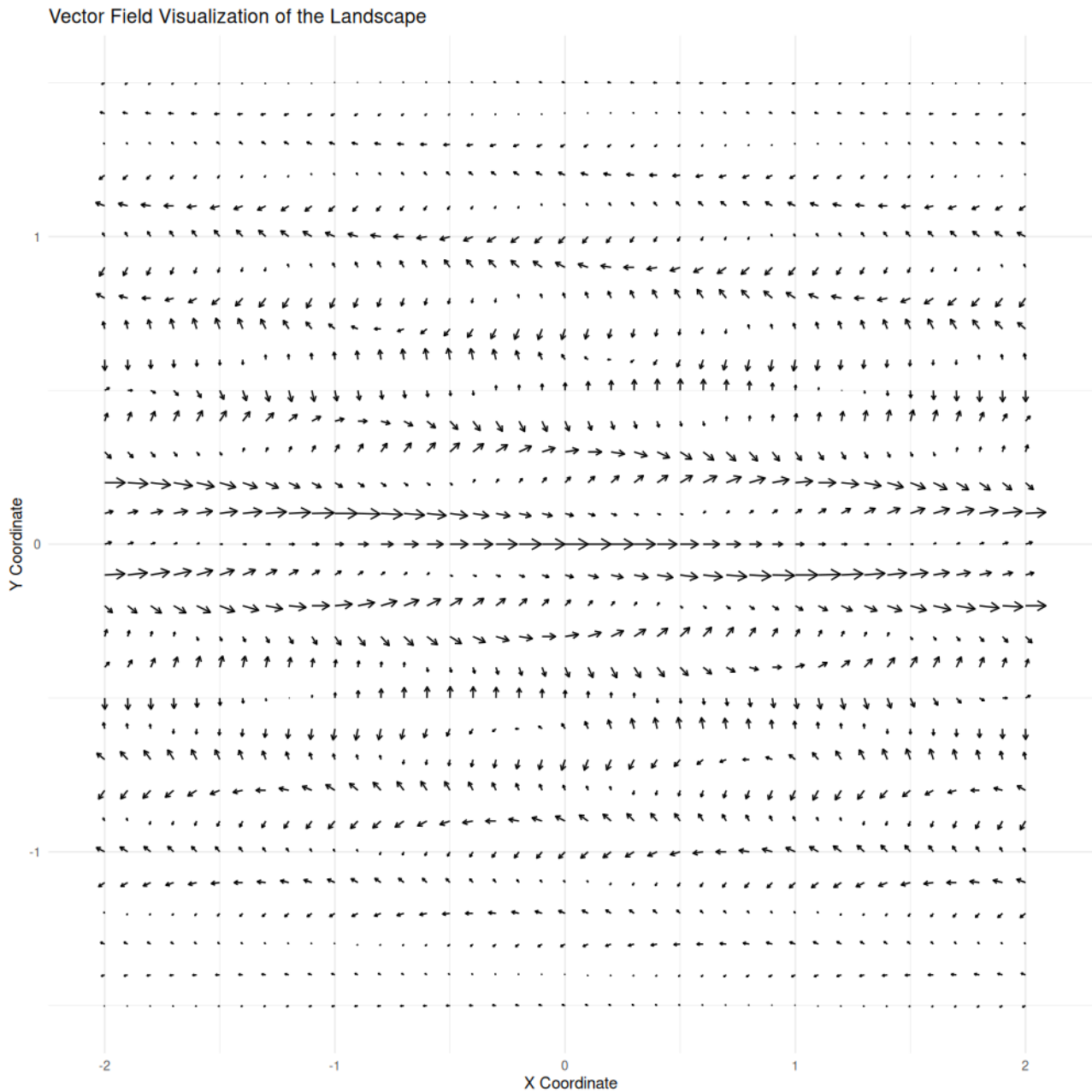
Uncomplete, was unabel to get this working.

6 Week 10 - Vector visualisation methods

6.1 Task 1

Question: Direct vector field visualisation using a quiver plot (as described in Task 1).

Answer:



6.2 Task 2

Question: Integral vector field visualisation using streamlines (one good visualisation and one poor visualisation, as described in Task 2).

Answer:

Streamlines with Bidirectional Paths

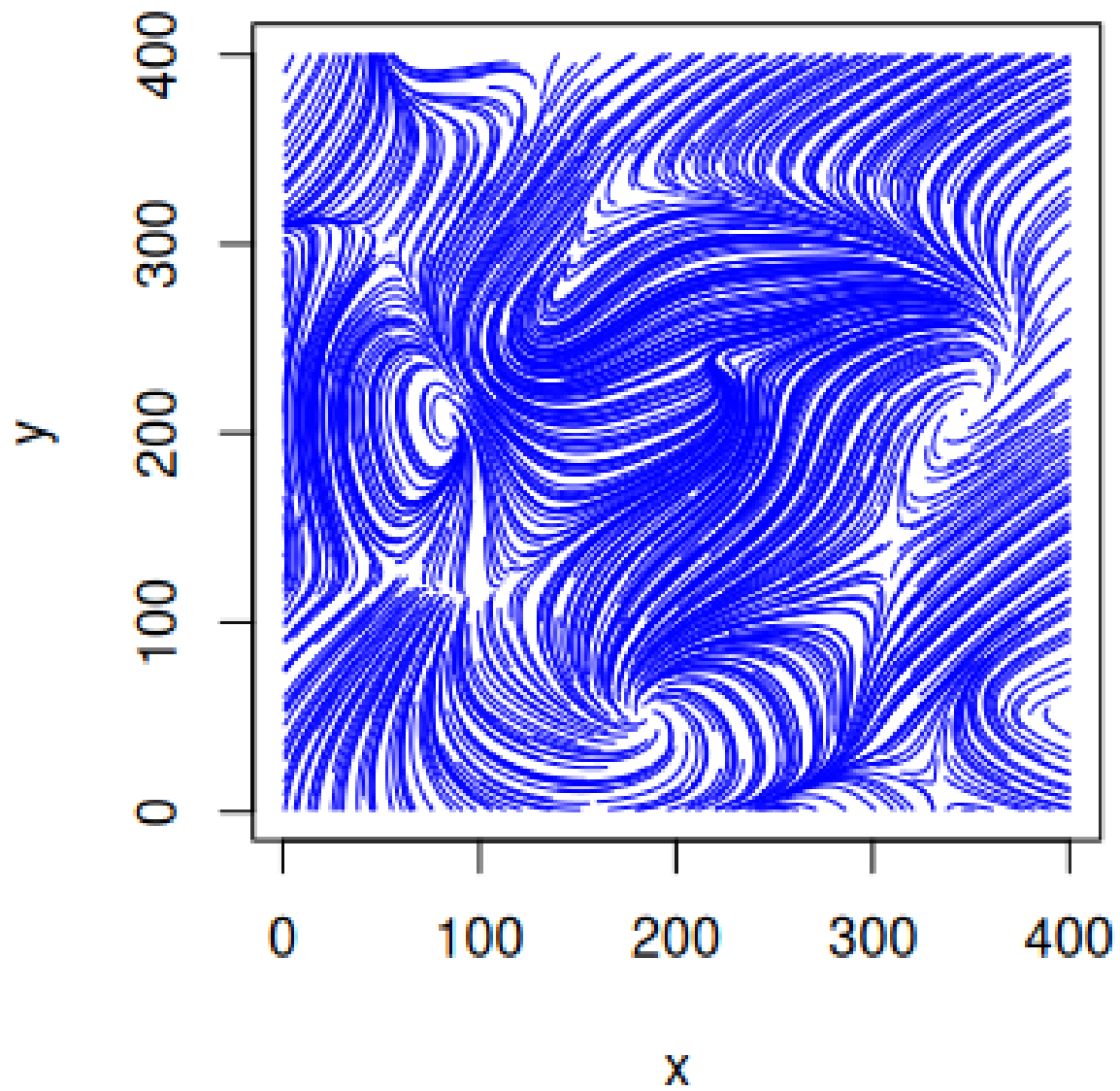


Figure 1: Good

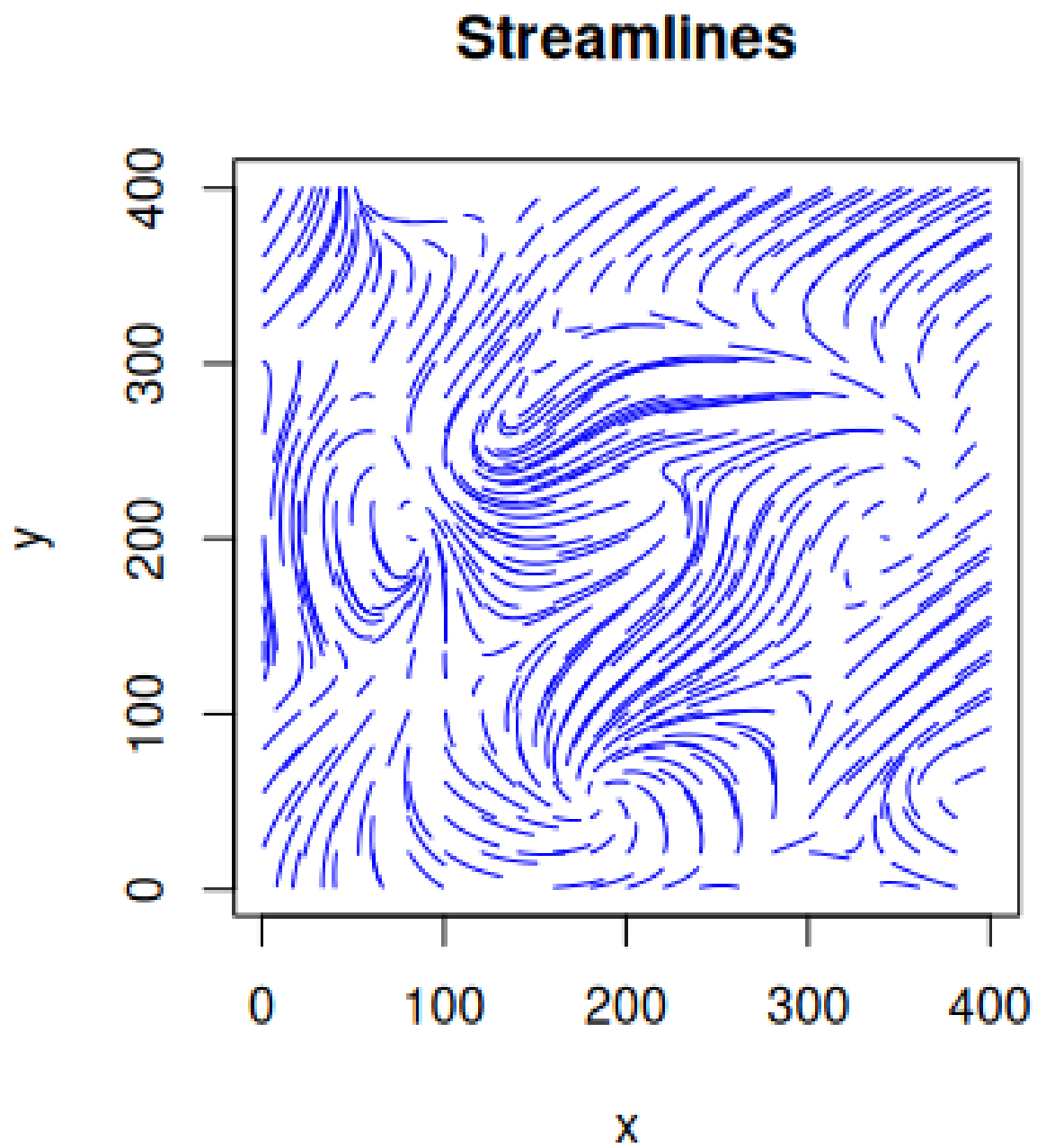


Figure 2: Bad

6.3 Task 3

Question: Line integral convolution for vector field visualisation (as described in Task 3).

Answer:

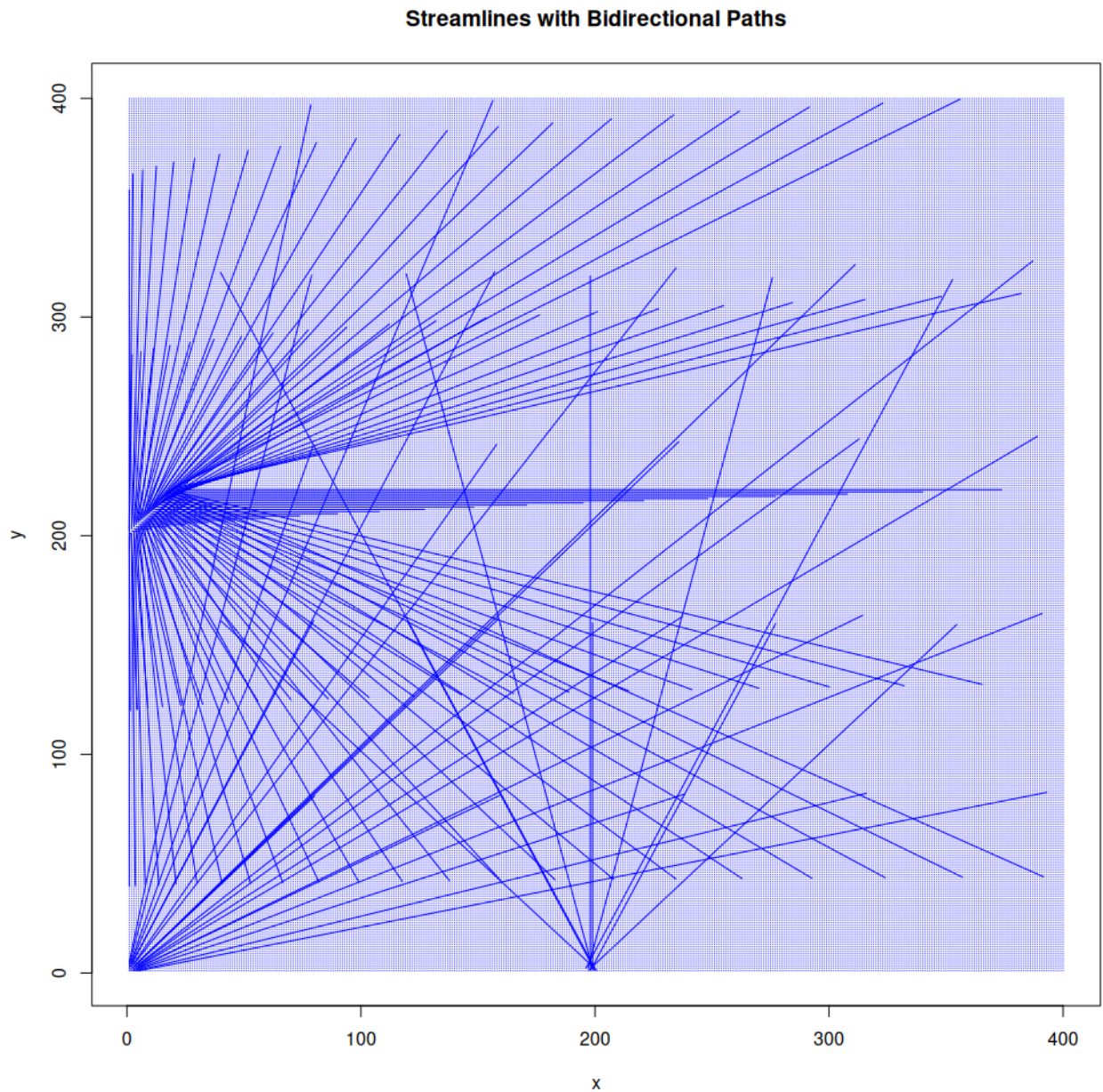


Figure 3: Bad

7 Week 12 - Visualising High Dimensional Data

7.1 Task 1

Question: A scatter plot of each dimension of the dataset against each other dimension. Colour code the different species.

Answer:

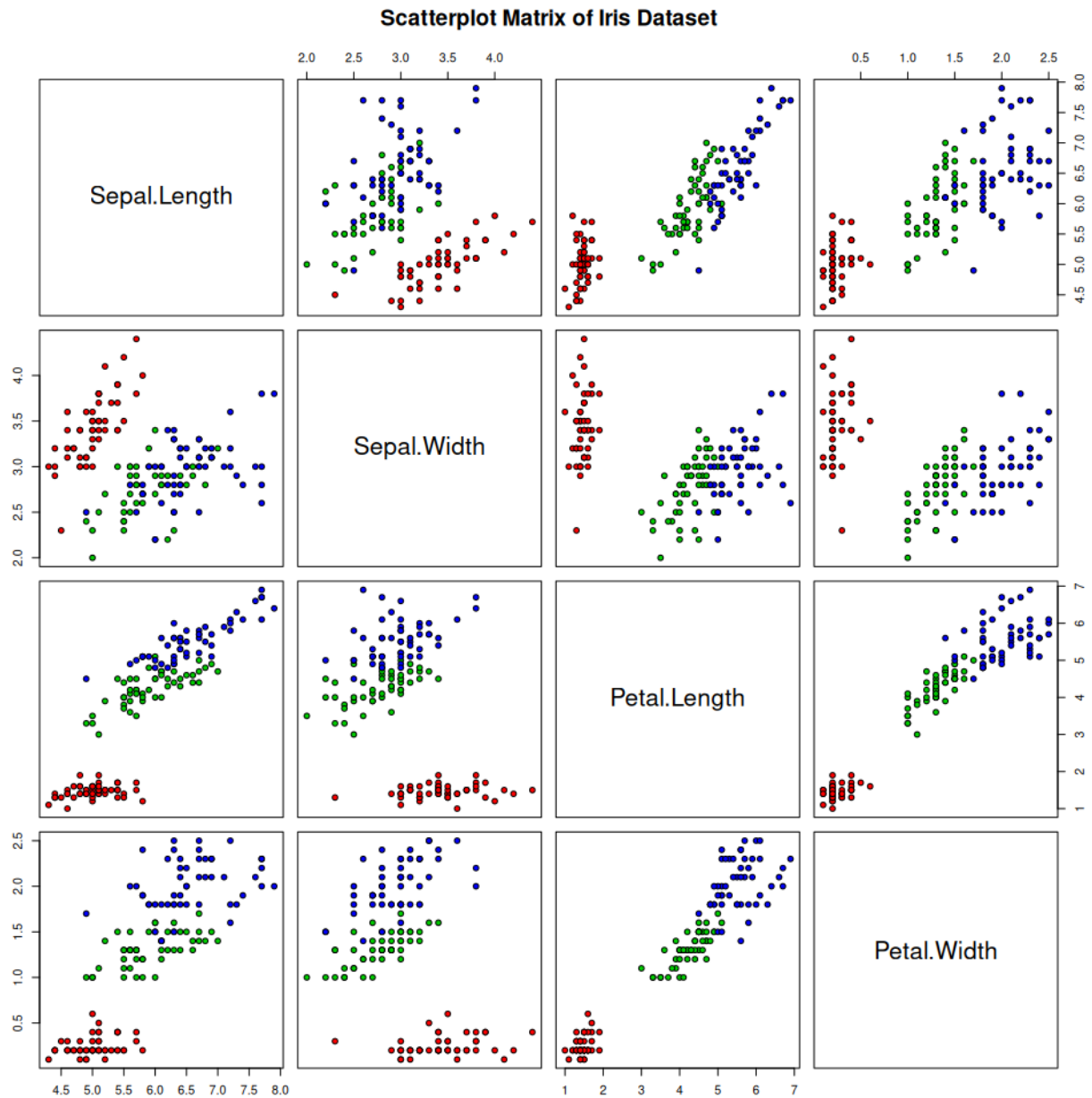


Figure 4: Bad

7.2 Task 2

Question: A scatter plot of the data projected onto the two principal components that explain the most variation.

Answer:

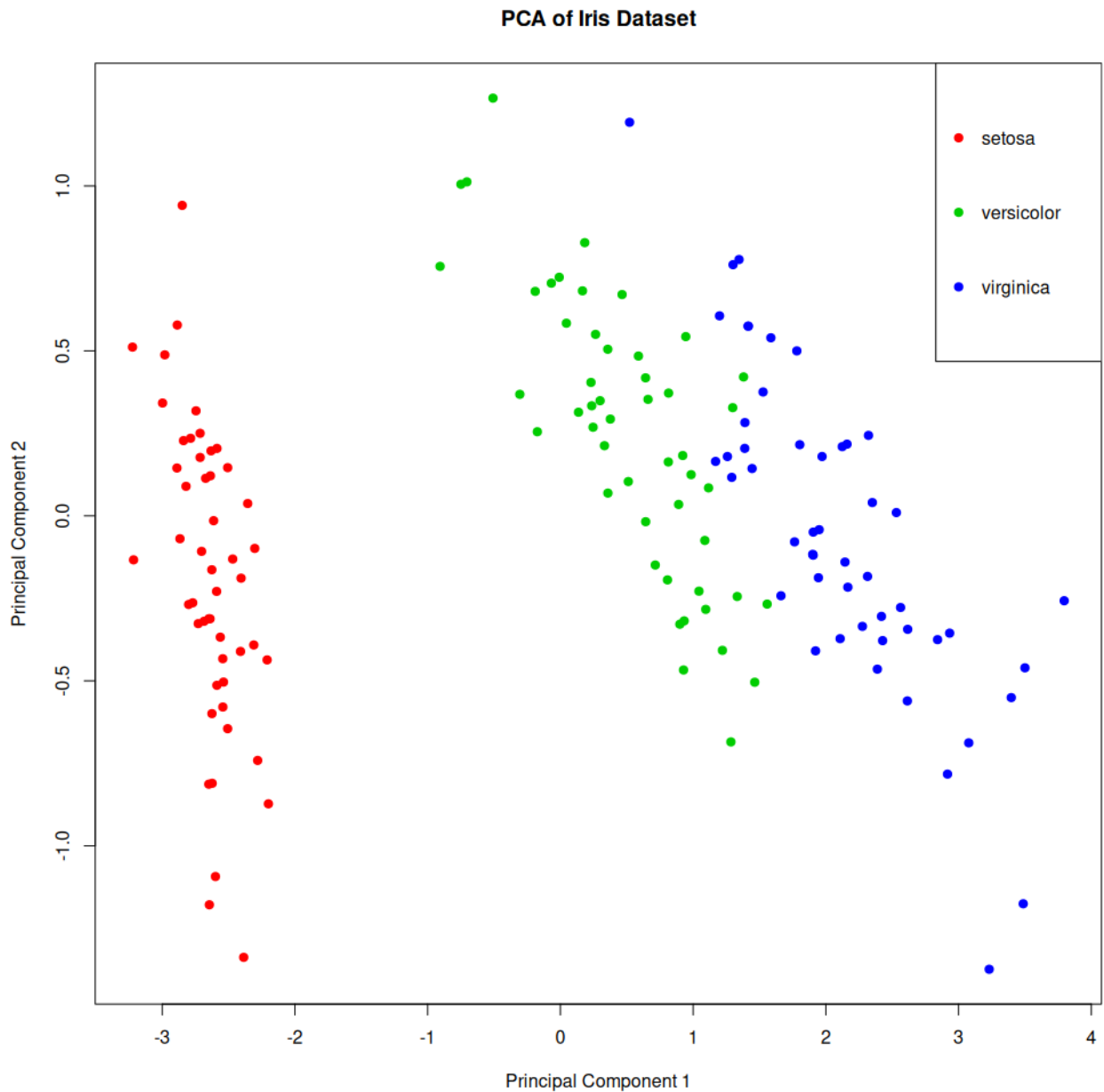


Figure 5: Bad

7.3 Task 3

Question: Calculate a good projection vector for applying LDA to the first two dimensions of the iris dataset. Report both the 2×1 vector W and the value of $J(W)$.

Answer:

Optimal Projection Vector W : 0.8267396 -0.5625848

Value of $J(W)$: 4.171799

7.4 Task 4

Question: A visualisation of the iris data along this projection vector, showing how it separates the different species of flower.

Answer:

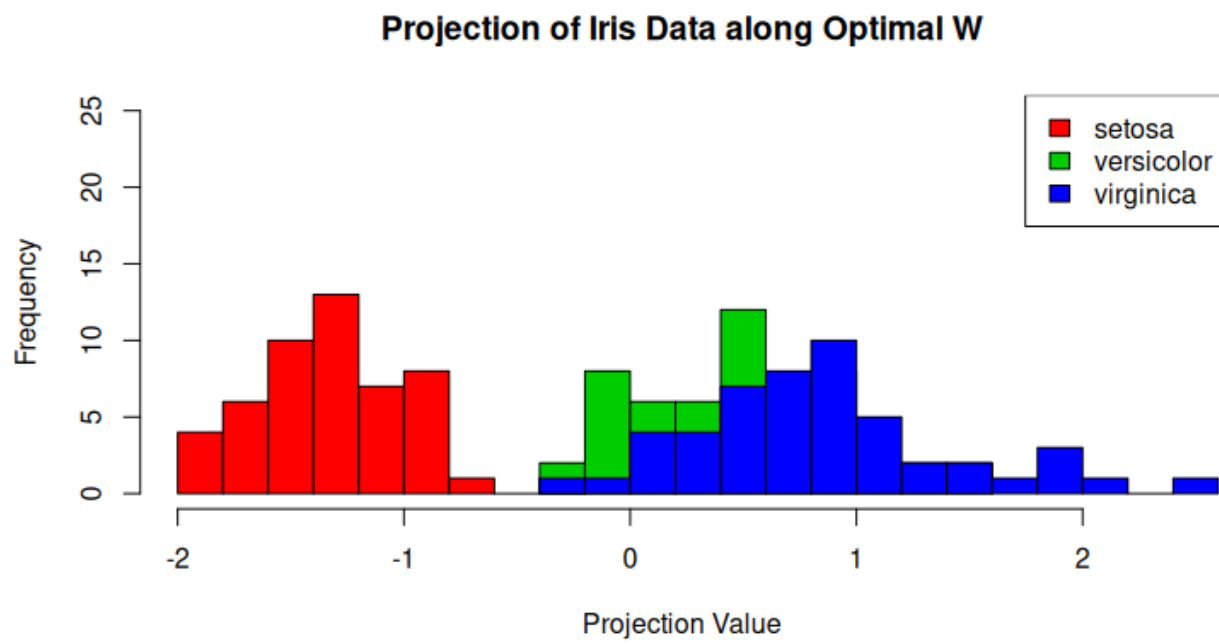


Figure 6: Bad