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Part Three Summary

(i) In the written component for this part, interpret your graphs from part (c). Especially explain why the graphs look the way they do.

Response

*** 3 scatterplots below**

The close relationship of the graphs can be reflected in the equation of:

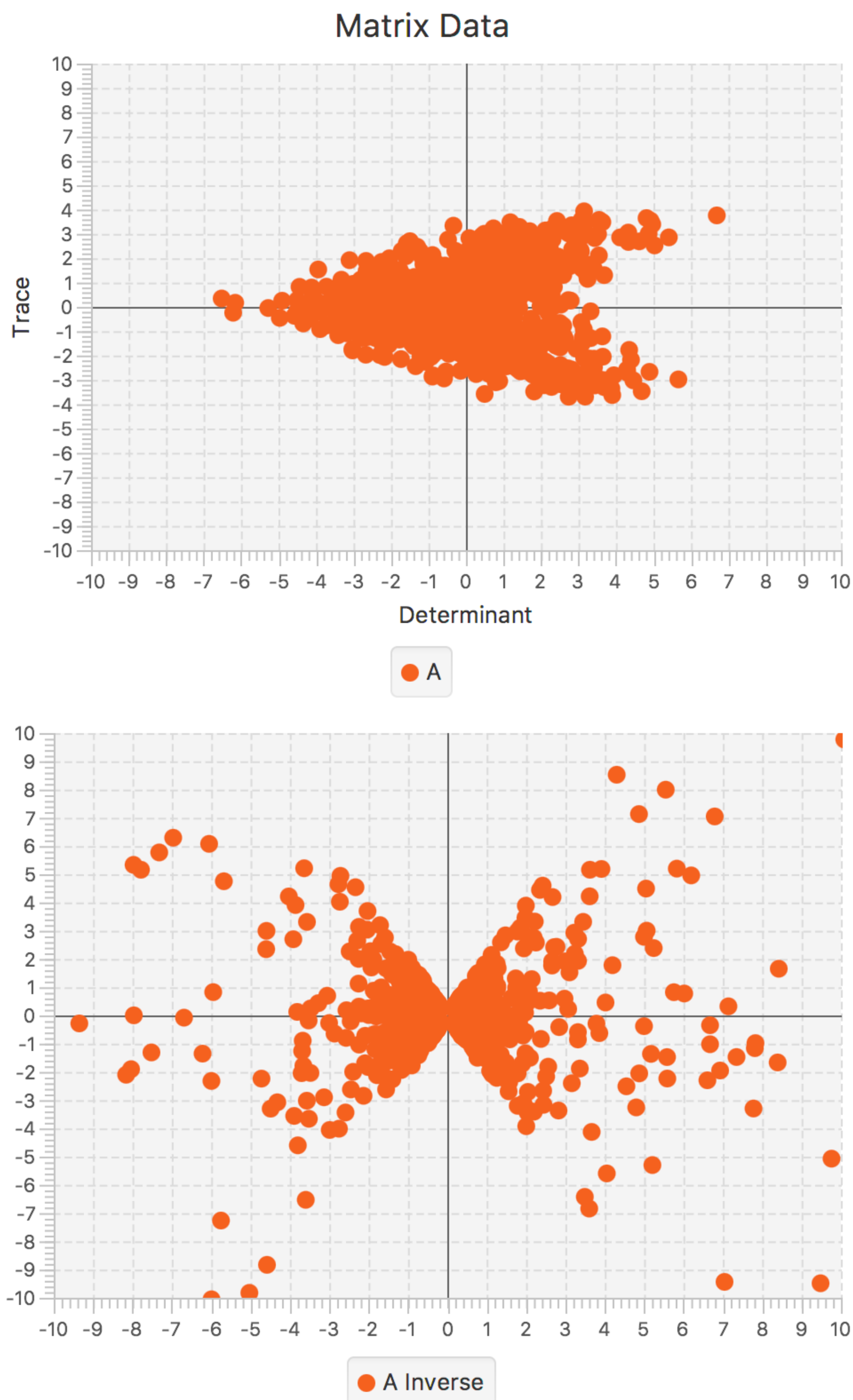
$$trace(A^{-1}) = \frac{\text{trace}(A)}{\det(A)}$$

This signifies that the trace will be the same, while the plot of the inverse of A will have each of its plots being divided by the determinant of A. The plots of the graphs themselves are thus determined using the x and y coordinates correlating to determinant and trace respectively. Using the equation above, we can thus determine the x and y coordinates of the inverse plot (the second plot of the second page). The trace of the inverse matrix is:

$$\frac{trace(A)}{\det(A)}$$

In addition, the determinant of the inverse matrix is just 1 over the determinant of A. Therefore, you can see that for the plot of A inverse, the points are mainly concentrated at (0,0), as each trace is getting divided by the determinant of A, resulting in relatively low y values. In instances where the determinant of A is less than that of the trace, you can see variations.

The number of iterations is also a key point to discuss in plotting these graphs. A key ratio to consider for this is: $\left|\frac{\lambda_1}{\lambda_2}\right|$. If the eigenvalues are close together, i.e. the ratio is small, the power method will require far less iterations. Therefore, the calculations requiring more iterations are shown as the lighter colors on the third page plot concentrated more towards the x-axis in the negative regions.


Matrix Data
Trace
Determinant
A
A Inverse

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