THE UNIVERSITY OF SYDNEY
MATH2921

Semester 1 | Vector Calculus and Differential Equations (Advanced) | 2020

**Assignment** *Due:* **Time Day Month 2020**
*A pdf copy to be submitted to the LMS website by this time*

**Note: Late assignments will lose marks in accordance with the policy on the information sheet. Attach this assignment sheet. Read the guidelines carefully. Be sure to put your name and SID on your assignment. Failure to follow the instructions will result in loss of marks.**

**Rules for Assignments Handed In:**

- Do not write your name on your assignment. Only your SID.
- Only typed assignments will be considered. Your assignment should be typed, and written in clear and proper language. Poorly written drafts will lose marks. **Handwritten assignments are considered drafts will not be accepted.**
- In your final submitted version, present the important steps that lead to the results. You should present only the important steps that lead to the results. Maximum page length for each response are next to the number. You may hand in fewer pages than the maximum allowed.
- Each question of the assignment should start on a new page. Make sure to hand in your assignment in order.
- **You must include a sources page at the end of your assignment where you cite your sources.** You can use what you like to help you with figuring out a problem, but what you write up should be your own understanding and words. And you need to tell me what you used to get to this understanding. This includes each other (Please refer to each other's SIDs to maintain anonymity).

  So for example if you found an example of a certain type of matrix on a given webpage, and used Mathematica to help you compute something, and you worked together with another student to complete the assignment, you need to document all of these facts on the sources page (again, using the appropriate SID). Your assignment will be compared with the other students' as well as what is on the web via the turnitin program. Should you have too great of a match without properly citing your sources, you may be in violation of the university's academic honesty policy.
- Unless otherwise instructed, leave your answer in exact form (i.e. $\sqrt{2}$ and not 1.4142...).
- All technological issues/risks are assumed by the submitter. Canvas/Turnitin not working for you two minutes before the deadline is not a valid excuse for late submission.
- For some problems you may need to include some figures/output from computer software packages. What you hand in should include direct images i.e converting them to an appropriate form and embedding them in the final document. You will need to incorporate these into your final answer, and you still need to stay within the page limits.
- Point totals for each question are next to the number. There are a total of 100 points possible on this assignment.

**Answer the following questions:**

## 1. Solution:

Here is where I would write up the solution to problem 1. Here is the expression for a matrix

$$A = \begin{pmatrix} 1 & 3 & 0 & 0 & 0 \\ 2 & 4 & 6 & -\pi & 10 \\ 2 & 0 & \frac{i}{e} & 0 & 6 \\ 3 & 0 & 5 & 7 & 9 \\ 0 & 0 & 0 & 1 & 0 \end{pmatrix}.$$

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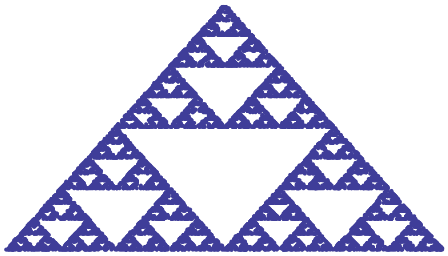
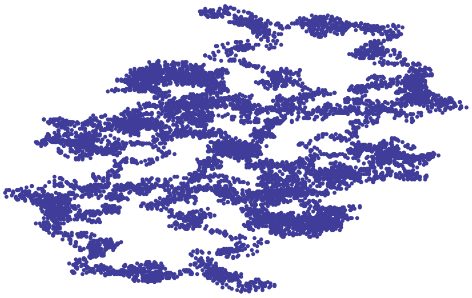
## 2. Solution:

Here is where your solution to the second question would go. Notice that it is on a separate page. Here is a picture that I made using Mathematica.



And here is another.



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## Sources

Don't forget to include a sources page. I used Mathematica in calculating some of the eigenvectors and eigenvalues, and in making the graphs/phase portraits.

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