

MA226 Sec B1 -Project

Consider the linear system $\frac{d\vec{Y}}{dt} = \begin{pmatrix} a & b \\ r & s \end{pmatrix} \vec{Y}$ where a and b are parameters and r is the first nonzero digit of your BU ID number and s is \pm the second nonzero digit of your BU ID number where the $+$ or $-$ is determined the last digit of your BU ID number. If the last digit is even then use $+$ if the last digit is odd then use the minus. For example if your BU ID number is U00304567 then $r = 3$ and $s = -4$.

For this lab you will draw a picture of the a - b plane indicating what type of linear system occurs at each point. We have seen that there are 11 types of behaviors for linear systems: sinks, sources, saddles, repeated root sinks, repeated root sources, spiral sinks, centers, spiral sources, zero eigenvalue sinks, zero eigenvalue sources and the degenerate case. Your picture will indicate in what regions of the a - b plane each of these behaviors occur.

You will hand in a packet with this project description as the first page. Page 2 will have your BU ID number and the system you are analyzing followed by your calculations. (This might take one page or two). The final page will contain your picture.

- Use only 8 ½ x 11 paper. You can use lined paper for your calculations and graph paper for the diagram of the parameter plane.
- Use colors (colored pencil is best) to indicate the different regions along with a general picture of the behavior of each region as show on page 351 of the book for the Trace-Determinant Plane
- neatness counts!!
- Project is due on or before Tuesday November 25.