

### §3.7 (PART 2): BIFURCATIONS IN LINEAR SYSTEMS

- 1.] Consider the one-parameter family of linear systems in the parameter  $a$ :

$$\frac{d\mathbf{y}}{dt} = \begin{bmatrix} -2 & a \\ -2 & 0 \end{bmatrix} \mathbf{y}.$$

Determine the critical bifurcation values for  $a$  and discuss the type of system along with the stability that lies in each region between bifurcations.

2.] Consider the one-parameter family of linear systems in the parameter  $a$ :

$$\frac{d\mathbf{y}}{dt} = \begin{bmatrix} 2a & -1 \\ 1 & -a \end{bmatrix} \mathbf{y}.$$

Determine the critical bifurcation values for  $a$  and discuss the type of system along with the stability that lies in each region between bifurcations.