Section 7.6: Complex Eigenvalues

Examples:

Solve the linear system $\boldsymbol{x}' = \begin{bmatrix} -1 & 2 \\ -2 & -1 \end{bmatrix} \boldsymbol{x}$

Solve the linear system $\boldsymbol{x}' = \begin{bmatrix} 0 & 1 \\ -10 & 2 \end{bmatrix} \boldsymbol{x}$

Solve the linear system $\boldsymbol{x'} = \begin{bmatrix} 1 & -1 \\ 5 & -3 \end{bmatrix} \boldsymbol{x}$

Given the linear system $\boldsymbol{x}' = \begin{bmatrix} 0 & -5 \\ 1 & a \end{bmatrix} \boldsymbol{x}$:

(a) Find the eigenvalues in terms of a.

(b) Find the critical values of a where the phase plane for the system changes. Describe the phase portrait for values of a on each subinterval.