P4

Monday, April 22, 2024 4:09 AM

$$A\vec{x} = \lambda\vec{x}$$

$$A\vec{x} - \lambda\vec{x} = 0$$

$$(A-\lambda)\vec{x} = 0$$

$$\begin{matrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & 1 & 2 \end{matrix}$$

$$\begin{matrix} 2-\lambda & -1 & 0 \\ -1 & 2-\lambda & -1 \\ 0 & 1 & 2-\lambda \end{matrix}$$

$$(2-\lambda)\begin{vmatrix} 2-\lambda & -1 \\ 1 & 2-\lambda \end{vmatrix} - (-1)\begin{vmatrix} -1 & -1 \\ 0 & 2-\lambda \end{vmatrix} + 0$$

$$(2-\lambda)\left[(2-\lambda)^2-(-1)\right]+\left[-(2-\lambda)\right]$$

$$(2-\lambda)\left[(2-\lambda)^2+1\right]+(2-\lambda)$$

$$(2-\lambda)\left[(2-\lambda)^2+1+2-\lambda\right]$$

$$\left[4-4\lambda+\lambda^2+2-\lambda\right]$$

$$(2-\lambda)\left[6-5\lambda+\lambda^2\right]$$

$$(2-\lambda)(-3+\lambda)(-2+\lambda)$$

$$\lambda=\{3,2\}$$

Positive definite b/c all eigenvalues are positive

Condition number: $\frac{3}{2}$