

$$\Leftrightarrow (5 - \lambda - 5\lambda + \lambda^2)(\lambda - 2) - 4(2 - \lambda)$$

$$\Leftrightarrow (2 - \lambda)(1 - 6\lambda + \lambda^2)$$

One  
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$$(1) \Leftrightarrow (2 - \lambda)(1 - 6\lambda + \lambda^2) = 0$$

$$\Leftrightarrow \begin{cases} 2 - \lambda = 0 \\ 1 - 6\lambda + \lambda^2 = 0 \end{cases}$$

$$\Leftrightarrow (2) \begin{cases} \lambda = 2 \\ \lambda = 3 \pm 2\sqrt{2} \end{cases}$$

So The eigenvalues are  $2$  or  $3 \pm 2\sqrt{2}$ .

Calculate eigenvectors.

Based on Gaussian elimination ~~to~~ eigenvalue to find eigenvectors

1. for eigenvalue in (2) we have.

$$(C - \lambda I)x = 0$$

\*: eigenvector associated with eigenvalue  $\lambda$

2. Find  $x$  by Gaussian elimination.  $\rightarrow$  convert the augmented matrix to row echelon form & solve the resulting linear system by back substitution.

$\Rightarrow$  by each of eigenvalue:  $(C - \lambda I : C)$

$$\boxed{\lambda = 2}$$