$$A = \begin{bmatrix} 4 & 8 & -1 \\ -2 & -9 & -2 \\ 0 & 10 & 5 \end{bmatrix}$$

$$A - \lambda I = \begin{bmatrix} 4-\lambda & 8 & -1 \\ -2 & -9-\lambda & -2 \\ 0 & 10 & 5-\lambda \end{bmatrix}$$

Compute determinant:

$$(4-\lambda)\begin{bmatrix} -9-\lambda & -2 \\ 10 & 5-\lambda \end{bmatrix} + (-8)\begin{bmatrix} -2 & -2 \\ 0 & 10 \end{bmatrix} + (-1)\begin{bmatrix} -2 & -9-\lambda \\ 0 & 10 \end{bmatrix} = 0$$

First Determinant

$(-9-\lambda)(5-\lambda) - (-2)(10)$

$= (-45 - 5\lambda - 9\lambda - \lambda^2) + 20$

$= -\lambda^2 - 14\lambda - 25$

Third ~~Second~~ Determinant

$(-2)(10) - (-9-\lambda)(0)$

$= -20$

Second ~~Third~~ Determinant

$(-2)(10) - (-9-\lambda)(0)$

$= -20$

Substituting

$(4-\lambda)(-\lambda^2 - 14\lambda - 25) - 8(-20) - 1(-20) = 0$

$(\cancel{4-\lambda})\ -4\lambda^2 - 56\lambda - 100 + \lambda^3 + 14\lambda^2 + 25\lambda$

$\lambda^3 + (-4\lambda^2 + 14\lambda^2) + (-56\lambda + 25\lambda) - 100$

$\lambda^3 + 10\lambda^2 - 31\lambda - 100 + 180 = 0$

$\lambda^3 + 10\lambda^2 - 31\lambda + 80 = 0$

Solve for λ: Trying $\lambda = -5$

$(-5)^3 + 10(-5^2) - 31(-5) + \cancel{1}80$

$-125 + 250 + 155 + 80 = 0$

$\lambda = -5$

Factoring

$(\lambda + 5)(\lambda - 5)(\lambda - 0) = 0$

Eigenvalues

$\lambda_1 = -5$

$\lambda_2 = 0$

$\lambda_3 = 5$

Importance

$\left(\frac{|\lambda|}{\Sigma|\lambda|}\right) \times 100$

$\lambda_1 = \frac{5}{10} \times 100 = 50\%$

$\lambda_2 = \frac{0}{10} \times 100 = 0\%$

$\lambda_3 = \frac{5}{10} \times 100 = 50\%$