

$$A = \begin{pmatrix} 2 & 0 & -1 \\ 1 & -3 & 0 \\ 0 & 4 & 2 \end{pmatrix}$$

$$S_1 = \text{tr}(A) = 2 - 3 + 2 = 1 \rightarrow p_1 = -S_1 = -1$$

$$S_2 = \text{tr}(A^2) = 4 + 9 + 4 = 17$$

$$A^2 = \begin{pmatrix} 4 & -4 & -4 \\ -1 & 9 & -1 \\ 4 & -4 & 4 \end{pmatrix}$$

$$p_2 = -\frac{1}{2} (S_2 + p_1 \cdot S_1) = -8$$

$$S_3 = \text{tr}(A^3) = 5 - 9 + 4 = -23$$

$$A^3 = \begin{pmatrix} 5 & -3 & 4 \\ -1 & 4 & -1 \\ 4 & -4 & 4 \end{pmatrix}$$

$$p_3 = -\frac{1}{3} (S_3 + p_1 \cdot S_2 + p_2 \cdot S_1) = 16$$

$$\begin{aligned} \chi(\lambda) &= (-1)^n (\lambda^n + p_1 \lambda^{n-1} + \dots + p_{n-1} \lambda + p_n) \\ &= (-1)^3 (\lambda^3 - 1 \cdot \lambda^2 - 8\lambda + 16) \end{aligned}$$