Info

This note, that was found here, as a part of a collection
is written (completely with human hands) by Rupadarshi Ray,
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Characteristic polynomials of $\mathsf{Mat}_{\mathbb{R}}(2)$

$$\begin{aligned} \det(IX - (-)) : \mathsf{Mat}_{\mathbb{R}}(2) &\to \mathbb{R}[X]_2 \\ \begin{bmatrix} a & b \\ c & d \end{bmatrix} &\mapsto \det\left(\begin{bmatrix} X & 0 \\ 0 & X \end{bmatrix} - \begin{bmatrix} a & b \\ c & d \end{bmatrix}\right) \\ &= \det\begin{bmatrix} X-a & -b \\ -c & X-d \end{bmatrix} \\ &= (X-a)(X-d) - bc \\ &= X^2 - (a+d)X + ad - bc \end{aligned}$$

more simply

$$A \mapsto X^2 - \mathrm{Tr}(A)X + \det(A)$$

removing decorations, we have

$$\begin{aligned} \mathsf{Mat}_{\mathbb{R}}(2) &\to \mathbb{R}^2 \\ \begin{bmatrix} a & b \\ c & d \end{bmatrix} &\mapsto (\mathrm{Tr}(-), \det(-)) = (a+d, ad-bc) \end{aligned}$$

roots are eigenvalues

$$\frac{\mathrm{Tr}(A)}{2} \pm \sqrt{\left(\frac{\mathrm{Tr}(A)}{2}\right)^2 - \det(A)}$$

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \mapsto$$

Current note has 0 direct children and 0 total descendants.

- squishy
  - $\mathsf{Mat}_{\mathbb{R}}(2)$
    - Characteristic polynomials of $\mathsf{Mat}_{\mathbb{R}}(2)$

And it has 3 siblings.

- squishy
  - $\mathsf{Mat}_{\mathbb{R}}(2)$
    - Characteristic polynomials of $\mathsf{Mat}_{\mathbb{R}}(2)$
    - $\mathsf{Mat}_{\mathbb{R}}(2)$ up to $GL_{\mathbb{C}}(2)$ conjugation
    - $\mathsf{Mat}_{\mathbb{R}}(2)$ up to $GL_{\mathbb{R}}(2)$ conjugation