Info

This note, that was found here, as a part of a collection
is written (completely with human hands) by Rupadarshi Ray,
was created on January 14, 2024 6:09:25 PM,
was last modified on September 7, 2026 2:39:45 PM, and
was exported on September 7, 2026 2:50:31 PM.

Mat$_{\mathbb{R}}(2)$ up to $GL_{\mathbb{C}}(2)$ conjugation

Exponential on Mat$_{\mathbb{C}}(2)$

JNF

Mat$_{\mathbb{C}}(2)$ upto $GL_{\mathbb{C}}(2)$ conjugation has two classes

$$\begin{bmatrix} \lambda_1 & 0 \\ 0 & \lambda_2 \end{bmatrix}$$

for $\lambda_1, \lambda_2 \in \mathbb{C}$ and

$$\begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix}$$

for $\lambda \in \mathbb{C}$.

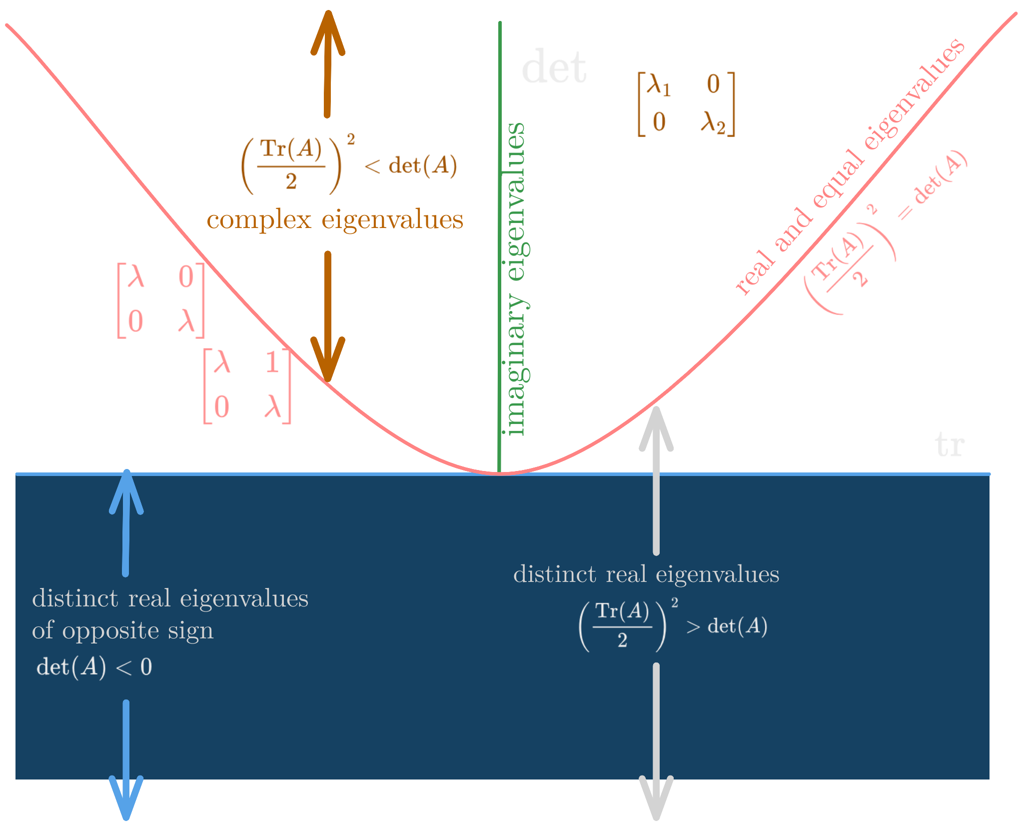
Now, for Mat$_{\mathbb{R}}(2)$, we have the characteristic polynomial which says

$$\lambda_1, \lambda_2 = \frac{\mathrm{Tr}(A)}{2} \pm \sqrt{\left(\frac{\mathrm{Tr}(A)}{2}\right)^2 - \det(A)}$$

Hence, there are 3 cases

	$\left(\frac{\mathrm{Tr}(A)}{2}\right)^2 - \det(A) \neq 0$	$\left(\frac{\mathrm{Tr}(A)}{2}\right)^2 - \det(A) = 0$
$\begin{bmatrix} \lambda_1 & 0 \\ 0 & \lambda_2 \end{bmatrix}$	Case 1: $\lambda_1 \neq \lambda_2$ (implies diagonal)	Case 2: $\lambda_1 = \lambda_2$ and diagonal
$\begin{bmatrix} \lambda & 1 \\ 0 & \lambda \end{bmatrix}$	(empty)	Case 3: not diagonal with eigenvalue λ

in other way



Current note has 0 direct children and 0 total descendants.

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

And it has 3 siblings.

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