Matrix Group

Presentation Assignment

Presenter: Subhankar Dhara
Date: November 27, 2025
Duration: 30 minutes

Presentation Instructions

- The presentation contains 20 points. It is divided into three parts. The content contains 12 marks, whereas the presentation and the question answer contain 6 marks.
- The time limit is strict. You may take at most 5 minutes extra. So, in any case, try to wrap up your talk by 35 minutes.

Presentation Topic

For $A \in M(n, \mathbb{H})$, $\det(A) \in \mathbb{R}$

The goal is to study the determinant of any quaternion matrix. Recall that we have seen that the usual definition of the determinant can not fit well with the quaternions. So, we will use the injective homomorphism $M(n, \mathbb{H}) \to M(2n, \mathbb{C})$ to find the determinant.

Problem

1. Explain the definition of determinant by the above homomorphism.
2. Use the above definition, to show that $A \in M(1, \mathbb{H})$, $\det A \in \mathbb{R}$.
3. Finally, show that for any $A \in M(n, \mathbb{H})$, $\det A \in \mathbb{R}$.

Good luck with your presentation! If you have any questions, please don't hesitate to reach out.