

SIT 292 – LINEAR ALGEBRA FOR DATA ANALYSIS

DISTINCTION TASK

TOPIC CHOSEN : *submitted by : jasveena -224001588*

Isometries and their application

LEARNING OBJECTIVES :

1. Explain the four types of isometries (translation, rotation, reflection, and glide reflection) by providing definitions and examples of each, demonstrating the preservation of distances.
2. Compute the matrix representation for each type of isometry in 2D space and apply these matrices to transform geometric shapes, confirming that the original distances are maintained.
3. Demonstrate the application of isometries in a computer graphics context by implementing basic transformations on a shape using software or programming, and visually verifying the congruence of the transformed shape with the original.
4. Summarise the significance of isometries in various fields (such as robotics, architecture, and physics) by discussing specific examples of their applications and how they contribute to problem-solving in those domains.

I plan on using the following textbook as reference as it covers all of my proposed learning objectives

"Linear Algebra and Its Applications" by David C. Lay

Key Features:

- **Isometries:** The book discusses transformations, including translations, rotations, and reflections, with examples and definitions.

- **Matrix Representation:** It provides thorough explanations of how to compute and apply matrix representations for various transformations in 2D space.
- **Applications:** There are sections that discuss the applications of linear algebra concepts, including isometries, in fields such as computer graphics, engineering, and physics.
- **Practical Implementation:** While it may not focus exclusively on programming, it includes examples and problems that allow for practical application of the concepts.