I. INTRODUCTION

1.1 Background

A robot is a machine that can take information from its surroundings using sensors and make decisions automatically[1]. The use of robots has improved automatic processes in industry because they can work in dangerous areas, have high accuracy, and can work for long periods of time[2].

A robotic arm is a series of rigid objects connected by joints that have a direction of movement and degrees of freedom that have been adjusted to suit needs[3]. The final position of the end-effector is determined by the angle formed by each joint.

Robot kinematics is the study of how robots move in terms of acceleration, velocity, and position. In robot kinematics, there are two methods, namely direct kinematics and inverse kinematics. Inverse kinematics is a method used to calculate the movement of a robot's joints based on the desired position and orientation of the end effector[1].

Inverse kinematic is a complex problem because the solution obtained depends on the type of robot used, such as the shape and number of degrees of freedom. This final project aims to find an inverse kinematic solution for a 6-DOF robot arm and test the accuracy of the movements that occur. To increase the accuracy of the robot arm movements, fuzzy logic is used.

1.2 Problem Formulation

The angle of each joint must be determined in order to move the robot arm to the needed coordinate point. The kinematic inverse will be harder to find the more degrees of freedom there are.

1.3 Objectives

The objective of this final project is to obtain the inverse kinematics equation of a 6-DOF robotic arm and use that equation to control the position of the robotic arm.

1.4 Benefit

The benefit of this final assignment is to understand the concept of robot control.

1.5 Problem Scope

1. The robot arm that is made cannot be too precise and complex due to limited tools and costs.
2. The mechanical strength of the robot arm material is ignored