



Design and Implementation of 2 DOF Arm Planar

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Introduction

Nowadays industries focus to minimize human intervention in handling critical environmental applications with so much advancement and research works carried out across the world, this dream can be absolutely made into reality in the age of automation with the current technology, pick and place robots are able to provide solutions in many applications.

Manipulator have the most critical role in advanced manufacturing technology in the modern industry. manipulators are composed of assemblies of links and joints. Links are defined as the rigid sections that make up the mechanism and joints are defined as the connection between two links. The device attached to the manipulator which interacts with its environment to perform tasks is called the end-effector. Robot manipulators can also be classified according to their nature of motion. A rigid body is said to perform a planar motion if all particles in the body describe plane curves that lie in parallel planes

Robot arm kinematics deals with the analytical study of the robot arm motion geometry with respect to a fixed reference coordinate system as a function of time without regarding the forces/torques that cause the motion the kinematic equations give the relation between the joint rotations and the position and orientation of the end effector. Determining the final position and orientation of the end effector depending on the joint angles is known as forward kinematics and finding the joint angles depending on the position of the end effector is known as inverse kinematics.

Research Goals/Objectives

- Designing of a 2 DOF planar.
- Implement of the design.

Literature Review

1- Al-mammon university collage, computer engineering techniques department, Iraq ,Baghdad.

Correspondence Author : Ahmed A.radhi

Accepted date :28 july 2018

Design and implementation of wireless mobile robotic arm controller based smart phone and embedded system via Bluetooth.

Abstract: The purpose of this research is to design and implement a pick and place objects mobile robotic arm based android controlling via Bluetooth by using Arduino microcontroller.

2- Department of electrical and electronics engineering university of Maiduguri, Maiduguri, Nigeria

Accepted date: march 2019

By: A.B.Buji, Y, P. Mshelia,A.G.Ibrahim and M.A.Sarki.

Model design, simulation and control of a robotic arm using PIC 16F877A MICROCONTROLLER.

Abstract: This paper focuses on model design, simulation and control of a five degree of freedom (DoF) robotic arm using servo motors. The robotic arm is controlled by a PIC 16F877A microcontroller and its main function is to generate pulse width modulation (PWM) signals which are to the servo motors for achieving the desired rotation angle.

3- Y.D.Patel [1] ,P.M. George[2]

[1] Associate professor, department of mechanical engineering, A.D.patel institute of technology, new vallabh vidyanagar, Gujarat, India.

[2] Professor, department of mechanical engineering, Birla vishvakarma mahavidyalaya engineering collage, vallabh vidyanagar, India.

Accepted date:sep-2013.

PERFORMANCE MEASUREMENT AND DYNAMIC ANALYSIS OF TWO DOF ROBOTIC ARM MANIPULATOR.

Abstract: Forward and inverse kinematic analysis of 2DOF robot is presented to predict singular configurations. Cosine function is used for servo motor simulation of kinematics and dynamics using Pro/Engineer. The significance of joint-2 for reducing internal singularities is highlighted. Performance analysis in terms of condition number, local conditioning index and mobility index is carried out for the manipulator.

Dynamic analysis using Lagrangian's and Newton's Euler approach is worked out analytically using MATLAB and results are plotted for their comparison.

4- Mashad Uddin Saleh [1], Gazi Mahamud Hasan [2], Mohammad Abdullah Al Shohel [3], Md. Abul Hasnat Ferdous [4], Biswajit Biswas Dipan [5]

Alumni, Dept. of EEE, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh [1,5].

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BSc Student, Dept. of EEE, Bangladesh University of Engineering and Technology, Dhaka, Bangladesh [4].

Accepted date:10,October 2013.

DESIGN AND IMPLEMENTATION OF A SIMPLE, LOW-COST ROBOTIC ARM.

Abstract: This paper describes the design of a 3-DOF robotic arm very much suitable for industrial purposes. The three DOF can perform lateral, vertical and grabbing movement profoundly.

5-department of mechatronic engineering technological university thanlyin, Myanmar

By : war war naing , kyi zar aung , aung thike.

Accepted date : 2018

Abstract: The purpose of this project is to eliminate the manual control for pick and place system. The robot arm is designed with three joints, two links and three Dc motors. Arduino microcontroller is used to generate the required angular position of the robot joints.

Methodologies

- Mathematical modeling.
- Kinematic analysis.
- Implementation of the planar.

System diagram

The visual model of the 2 DOF planar.

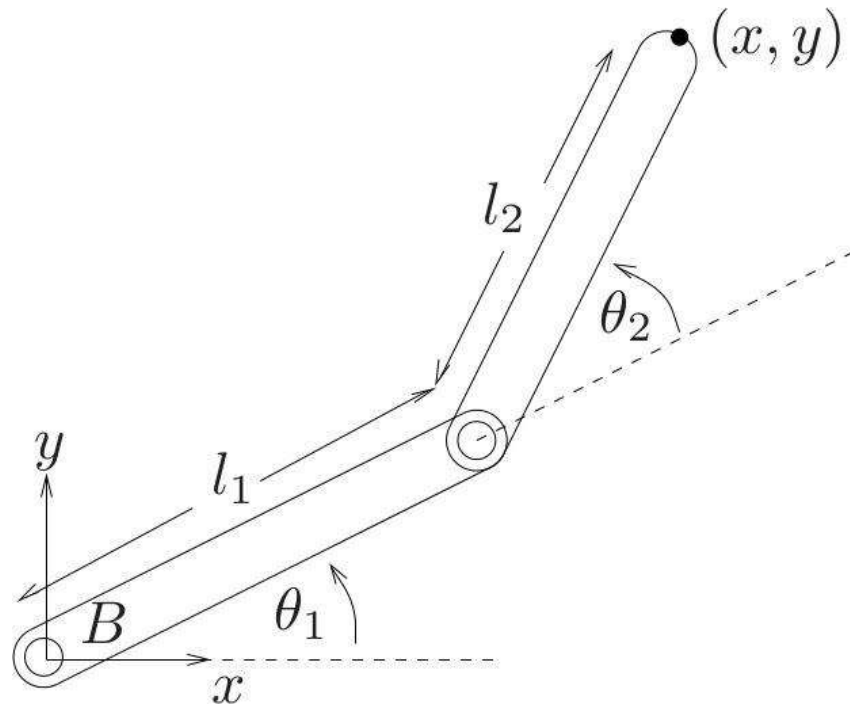


Fig. Visual Model of the Planar with the joints.

Timelines

- November 1, 2019 Literature review.
- December 1, 2019 Designing and Modeling of the Planar.
- January 1, 2020 Implementing the design and working on practical parts.
- February 1, 2020 Calculations and Kinematics analysis.
- March 1, 2020 Calculations and Kinematics analysis.
- April 1, 2020 Publishing and presenting the project.

References

Manipulating Industrial Robots—Vocabulary, ISO 8373, 1994 .

Automation, LJ Welding. "Welding Manipulators | Subarc Welding & CMT Manipulators" .

Introduction to Robotics by phillip Mckerrow.

Introduction to Robotics Mechanics and Control , Third Edition John J. Craig

Robot analysis by LUNG-WEN TSAI .

A Mathematical Introduction to Robotic Manipulation by Richard M. Murray

Robot Modeling and Control by Mark W. Spong & Seth Hutchinson & M. Vidyasagar