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" وَوَصَّيْنَا الْإِنسَانَ بِوَالِدَيْهِ إِحْسَاناً حَمَلَتْهُ أُمُّهُ كُرْهاً وَوَضَعَتْهُ كُرْهاً وَحَمْلُهُ وَفِصَالُهُ ثَلَاثُونَ شَهْراً حَتَّى إِذَا بَلَغَ أَشُدَّهُ وَبَلَغَ أَرْبَعِينَ سَنَةً قَالَ رَبِّ أَوْزِعْنِي أَنْ أَشْكُرَ نِعْمَتَكَ الَّتِي أَنْعَمْتَ عَلَيَّ وَعَلَى وَالِدَيَّ وَأَنْ أَعْمَلَ صَالِحاً تَرْضَاهُ وَأَصْلِحْ لِي فِي ذُرِّيَّتِي إِنِّي تُبْتُ إِلَيْكَ وَإِنِّي مِنَ الْمُسْلِمِينَ "

الأحقاف

Dedication

Dedicated to
My father soul....
To the Candle of my life ....my mother...
My brother and sister...
My family who always shared my failures and happiness....
And to my colleagues...

ACKNOWLEDGEMENT

I thank Allah, the lord of the worlds, for his mercy and limitless help and guidance. May peace and blessings be upon Mohammed the last of the messengers.

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ABSTRACT

This thesis introduces the fundamental knowledge used in robotics. This knowledge can be utilized to develop computer programs for analyzing the kinematics, dynamics, and control of robotic systems. Modeling and control of five degree of freedom (DOF) robot arm is the subject of this thesis. The modeling problem is necessary before applying control techniques to guarantee the execution of any task according to a desired input with minimum error. Deriving forward kinematics is an important step in robot modeling based on Denavit Hartenberg (DH) representation.

At this thesis the controller for robotic arm using PIC microcontroller (16F877A) was designed with the aim of carrying out tasks such as moving objective from place to another.

ملخص

هذه الأطروحة تـ قدم المعرفة الأساسية المستخدمة في الذراع الالي. يمكن استخدام هذه المعرفة لتطوير برامج حاسب الي لتحليل علم الحركه وعلم السكون والسيطرة على أنظمة الذراع الالي

هذه الأطروحة تهتم ايضا بمشاكل النمذجة والتحكم لذراع الي ذو خمس درجات حره . نمذجه الذراع الالي مهمه قبل تطبيق انظمه التحكم وذلك لضمان تنفيذ المهمه المطلوبه وفـ قا للدخل المرجعي و با قل نسبه خطا . وعند نمذجه الذراع الالي فان اشتـ قاق الحركه الاماميه لمحاور الذراع الالي هي خطوه اساسيه استنادا الي طريـ قه (Denavit Hartenberg).

في هذه الأطروحه تم تصميم دائره تحكم للذراع آلالي باستخدام المتحكمات الد قيـ قه(PIC 16F877A) لتنفيذ مهمه نـ قل هدف من مكان الي اخر.

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LIST OF ABBREVIATIONS

DOF	Degree of Freedom
DH	Denavit- Hartenberg
DC	Direct Current
FK	Forward Kinematic
IK	Inverse Kinematic
P	Prismatic
PD	Proportional Derivative
R	Revolute
SCARA	Selective Compliant Articulated Robot for Assembly
AC	Alternative current
DC	Direct current
PID	Proportional – Integral – Derivative
CW	Clock Wise
CCW	Counter Clock Wise
PC	Personal Computer
RIA	Robot Institute of America
AFR	Association Francaise de Robotique
PI	proportional – Integral
RPM	Revolutions per Minutes
EMF	Electromagnetic Field