

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

الاية

اقْرَأْ بِاسْمِ رَبِّكَ الَّذِي خَلَقَ (1) خَلَقَ الْإِنْسَانَ مِنْ عَلَقٍ (2) اقْرَأْ وَرَبُّكَ
الْأَكْرَمُ (3) الَّذِي عَلَّمَ بِالْقَلَمِ (4) عَلَّمَ الْإِنْسَانَ مَا لَمْ يَعْلَمْ (5)

صدق الله العظيم

سورة العلق

Dedication

*To my parents,
Whom they sacrificed their own welfare for me*

Acknowledgment

I wish to express my profound gratitude to my supervisor Dr. Ala Eldin Awouda, for his valuable guidance, continuous encouragement, worthwhile suggestions and constructive ideas throughout this research. His support, pragmatic analysis and understanding made this study a success and knowledgeable experience for me.

Abstract

The development of high performance motor drives is very important in industrial as well as other purpose applications such as electric trains and robotics. Generally, a high-performance motor drive system must have good dynamic speed command tracking and load regulating response to perform task.

In this project present an implementation of self-tuned Fuzzy-PID controller for speed control of DC motor based Mat lab/Simulink. The algorithms of Fuzzy-PID controller and conventional PID controller are implemented using PID and Fuzzy logic simulation toolkit of the Mat lab.

The simulation results demonstrate that the designed self-tuned Fuzzy-PID controller realize a perfect speed tracking with lesser over shoot and settling time, minimum steady state error and give better performance compared too conventional PID controller and Fuzzy controller.

المستخلص

تطوير قيادة محرك عالي الاداء في غاية الاهمية في الصناعة،فضلا عن غيرها من التطبيقات مثل القطارات الكهربائية والروبوتات .

عموما نظام قيادة محرك عالي الاداء يجب ان يكون متتبع جيد للسرعة الديناميكية وجيد لاستجابة تنظيم الحمل لاداء المهمة .في هذا المشروع تم تقديم وتطبيق متحكم غامض- تناسبي تكاملي تفاضلي ذاتي التنعيم للتحكم في سرعة محرك التيار المستمر بناءا علي محاكاة / ماتلاب . الخوارزميات لمتحكم غامض- تناسبي تكاملي تفاضلي ومتحكم تناسبي تكاملي تفاضلي تقليدي تم تطبيقها باستخدام متحكم تناسبي تكاملي تفاضلي ومتحكم المنطق الغامض بأدوات المحاكاة في ماتلاب .

وتبين نتائج المحاكاة أن تصميم متحكم غامض- تناسبي تكاملي تفاضلي ذاتي التنعيم تحقق أفضل تتبع للسرعة مع ادني تجاوز للحد المطلوب وتقليل حالة استقرار الخطاء وتعطي افضل أداء مقارنة بمتحكم تناسبي تكاملي تفاضلي التقليدي ومتحكم المنطق الغامض .

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List of Abbreviations

PID	<i>Proportional-Integral-Derivative</i>
AC	<i>Alternative Current</i>
DC	<i>Direct Current</i>
FLC	<i>Fuzzy Logic Controller</i>
NL	<i>Negative Large</i>
NS	<i>Negative Small</i>
PVS	<i>Positive Very Small</i>
PS	<i>Positive Small</i>
PMS	<i>Positive Medium Small</i>
PM	<i>Positive Medium</i>
PML	<i>Positive Medium Large</i>
PL	<i>Positive Large</i>
PVL	<i>Positive Very Large</i>
MFs	<i>Membership Functions</i>
COG	<i>Center of Gravity</i>
PMDC	<i>Permanent Magnet DC motor</i>
SISO	<i>Single input single output</i>
MIMO	<i>Multi input multi output</i>
GA	<i>Genetic algorithm</i>