

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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سورة الفاتحة

Dedication

To my parent, brothers, sisters & my wife

Acknowledgment

My thanks firstly go to almighty God without whose help none of this could have been done.

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List of Abbreviations

E_x	The back electro magneto force of phase x
J	Inertia of motor and load combination
L_s	Self-inductance per phase
M	Mutual inductance
P	Number of poles
R	Resistance of motor winding per phase
T_L	The load torque
$V_{x n}$	the phase to neutral voltage of phase x
I_x	is the current in phase a, b and c of the PMBLDC motor
ω_r	Rotor speed, radian per second
θ	Rotor position
PWM	pulse width modulation
PFC	power factor correction
PI	proportional integral
PMBLDC	permanent magnet brush less direct current motor
CC-VSI	current controlled voltage source inverter
EMF	electro magneto force
RMS	root mean square
DSP	digital signal processor
ASD	adjustable speed drives
IGBT	insulated gate bipolar transistor

SMPSs	switch mode power supplies
MOSFET	metal oxide semi conductor field emitter transistor
BESSs	battery energy storage systems
UPSs	uninterrupted power supplies
GTO	gate turn-off
SMRs	switch-mode rectifiers
THD	total harmonic distortion
UPS	uninterruptible power supply
VAR	voltage automatic regulation
PIV	peak inverse voltage
AFs	active filters
DF	displacement factor
CF	crest factor
PF	power factor

مستخلص البحث:

البحث يناقش أداء محول تصحيح معامل القدرة الذي غذي به محرك التيار المستمر ذو المغنطيس الدائم الخالي من الفرش عبر مبدل مصدر الجهد والذي تم تحليله بالنسبة لعمليات السرعة المتغيرة لمكيف الهواء.

وإعتبر مقوم القنطرة أحادي الطور بالإضافة إلى المحول المعزز عبارة عن محول تصحيح معامل القدرة الذي يحسن كمية التيار المسحوب من مصدر التيار المتردد.

وهذا المحول له القدرة في التغذية بجهد ثابت لمبدل مصدر الجهد الذي يغذي المحرك عندما يكون جهد المصدر متردد.

وإن عملية تحكم الحلقة المغلقة بالنسبة لمحول تصحيح معامل القدرة ومبدل مصدر الجهد الذي غذي به المحرك يعبر عن أفضل أنواع التحكم، كما أنه سهل في حفظ الطاقة لنظام توزيع التيار المتردد لمحركات التيار المستمر (ذو المغنطيس الدائم خالي الفرش) الذي يدير محرك ضاغط الهواء. وتمت الدراسة للنظام المقترح ورسمت مخططات محاكاة أدائه.

Abstract:

In this thesis the performance of a power factor correction (**PFC**) converter fed voltage source inverter (**VSI**) supplying permanent magnet brushless direct current (**PMBLDC**) motor drive is analyzed for the variable speed operation of an air conditioner. And a single-phase diode bridge rectifier together with a boost converter is considered as a PFC converter, which improves the quality of the current drawn from the ac mains.

This converter is capable of supplying a constant dc link voltage to **VSI** fed **PMBLDC** motor, even when the voltage of the ac mains fluctuates.

The closed loop control of PFC converter and VSI fed **PMBLDC** motor provides a better control and facilitates energy conservation in ac distribution system, **PMBLDC** motor and the compressor of an air conditioner. The proposed system is modeled and its simulated performance are presented and discussed.