بسم الله الرحمن الرحيم

الايــة

قوله تعالي:

(يرفع الله الذين امنوا منكم والذين اتو العلم درجات)

صدق الله العظيم

[المجادلة : 11]

Dedication

I commit this venture to God Almighty my maker, my solid column, my wellspring of motivation, astuteness, information and comprehension. He has been the wellspring of my quality all through this program and on His wings just have I took off. I likewise commit this examination tenderly to My Mum and Father .

Acknowledgements

I have taken lots of effort to finish this dissertation, which I wouldn't have been able to finish without the help I received.

First of all, I would like to thank my supervisor A. Marwa Abd-alhafeez Ahmed Araibi , for giving information and steady supervision all throughout the journey. Her redirections, inspiration and constructive criticism has helped me extremely.

Furthermore, I might want to demonstrate my appreciation to my family. Their support and consolation have roused me to complete this venture.

Also, I might want to thank my folks to be comprehended amid the venture improvement time.

Finally, I would like to acknowledge the great help I received from my companions. Their consultations has helped me to take care of the issues confronted in the venture.

Abstract:

This research dwelt on the simulation of the impact of soft starter controller on induction motor transients. It was aimed at resolving the various challenges inherent in the dynamic operation of asynchronous motors, which included current and torque surges during motor start up. The method leading to solution include comprehensive mathematical model of asynchronous motor in both steady state and dynamic state conditions; as well as the development of soft starter control scheme and its application for the motor operational control and finally, the simulation of the impact of soft starter controllers on machines performance or behavior during transients from standstill to synchronous speed was carried out using MATLAB/SIMULINK software.

The MATLAB/SIMULINK simulation was used to determine the variation of the starting inrush current and starting torque pulsation under different firing angle and so using the pulse width between (70% - 90%) . With the applied voltage of 220V, the starting current is between +200A and - 150A and the torque pulsation is between -85Nm and +300Nm when connected directly to the supply. It is seen that the starting inrush current is about 3 to 8 times of the motor no-load current. A control scheme is proposed for reducing the inrush current and torque pulsations. It was observed that the inrush current was about ±100A and the torque pulsation is between -140Nm and +120Nm. The inrush current is reduced to about 66.6%.

المستخلص

يتناول هذا البحث محاكاة تأثير تحكم بداية لينة لتشغيل المحرك الحثي ثلاثي الطور. ويهدف إلى حل التحديات المختلفة الكامنة في التشغيل الديناميكي للمحركات الحثيه ، والتي شملت الزياده في التيار وعزم الدوران أثناء بدء المحرك. تشتمل الطريقة المؤدية إلى الحل على نموذج رياضي شامل للمحرك غير المتزامن في كل من الحالة الثابتة وظروف الحالة الديناميكية. بالإضافة إلى تطوير نظام التحكم للبدايه الينه (soft starter)وتطبيقه على التحكم التشغيلي للمحرك وأخيرًا ، تم تنفيذ محاكاة تأثير وحدات التحكم soft starter على أداء الماكينات أو سلوكها أثناء العبور من السكون إلى السرعة المتزامنة باستخدام برنامج MATLABASIMULINK. تم استخدام المحاكاة MATLAB / SIMULINK لتحديد تباين بداية تدفق الحالي ونبض عزم الدوران تحت زاوية إطلاق مختلفة وهكذا باستخدام عرض النبض بين (70٪ -90٪) ، مع الفولطية المطبقة من 220 فولت ، تيار البدء بين + A200 و- A 150 ونبض العزم ما بين Nm85 و + Nm300 عند التوصيل المباشرة إلى المحرك. من الملاحظ أن تيار بدء التشغيل هو حوالي 3 إلى 8 مرات من تيار عدم التحميل. يقترح مخطط تحكم لتقليل نبضات تيار الاندفاع وعزم الدوران. لوحظ أن تيار الاندفاع حوالي + 100 أمبير وأن نبض عزم الدوران يتراوح بين 140 Nmو Nm120. يتم تقليل تدفق التيار إلى حوالي 66.6٪.

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