

Elimination of the DC Bus Sixth Harmonic Component in Integrated Modular Motor Drives Using Third Harmonic Injection Method

Mesut Uur

Department of Electrical and Electronics Engineering
Middle East Technical University
Ankara, Turkey
Email: ugurm@metu.edu.tr

Ozan Keysan

Department of Electrical and Electronics Engineering
Middle East Technical University
Ankara, Turkey
Email: keysan@metu.edu.tr

Abstract—In this paper, a novel method to eliminate the harmonic component occurring on the DC bus which is six times the grid frequency is proposed. This harmonic component is present due to natural commutation of the passive diode bridge rectifier in motor drive applications. In conventional drives, bulky LC filters are utilized to reduce the effect of this harmonic component to the motor drive inverter. With this method, DC bus capacitance requirement can be minimized which will enhance the power density and decrease the cost of the overall system. Third harmonic injection is used with modular inverters in an integrated modular motor drive application. Both rectifier and inverter side analytical models are presented, the elimination of the sixth harmonic component is described analytically, and verified by simulations performed on MATLAB/Simulink. The possible adverse effects of third harmonic injection method are also discussed.

I. INTRODUCTION

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mds

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II. ANALYTICAL MODEL OF THE RECTIFIER

Rectifier model, 6th harmonic component injection, LC filter characteristics

III. DESCRIPTION OF THE PROPOSED METHOD

Proposed method: Sixth harmonic creation on the DC link with third harmonic injection (analytical)

IV. IMPLEMENTATION OF THE METHOD AND PRACTICAL ISSUES

New IMMD scheme for third harmonic injection, practical considerations, effects on other components, torque ripple, copper loss etc.

V. RESULTS

Simulation results

VI. CONCLUSION

The conclusion goes here.

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REFERENCES

- [1] H. Kopka and P. W. Daly, *A Guide to L^AT_EX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.