Optimization of a Method to Evaluate the Fundamental Frequency in Real Time

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***Abstract*— The problem studied in this paper and described in the literature is determining the fundamental frequency of a non-trivial signal in real-time. Using the gradient-descent algorithm, a new optimized method for fundamental frequency evaluation was proposed. The comparison between the two methods, classic and optimized, was carried out by utilizing a sine, square and amplitude modulated wave as input. In all cases, using the optimized method the system clearly performs better.**

***Keywords*— electrical machines diagnosis, fundamental frequency evaluation, gradient-descent algorithm, automatic adjustment system**

REFERENCES

[1] William T. Thomson and Mark Fenger, „Current signature analysis to detect induction motor faults", IEEE Industry Applications Magazine, pp. 26-34, July/August 2001.
[2] IEEE Motor Reliability Working Group, "Report of large motor reliability survey of industrial commercial installations - Part I", *IEEE Trans. Ind. Applicat.*, vol IA-21, pp. 853-872, July/Aug. 1985.
[3] O.V. Thorsen and M. Dalva, "Condition monitoring methods, failure identification and analysis for high voltage motors in petrochemical industry", *Proc. 8th Inst. Elec. Eng. Int. Conf., EMD'97*, University of Cambridge, no. 444, pp. 109-113, 1997.
[4] Arun Gandhi, Timothy Corrigan, Leila Parsa, „*Recent Advances in Modeling and Online Detection of Stator Interturn Faults in Electrical Motors*", IEEE Transactions on Industrial Electronics, vol. 58, no. 5, may, 2011.
[5] A. Bonnett and G. Soukup, ''Cause and analysis of stator and rotor failures in three-phase squirrel-cage induction motors'', *IEEE Trans. Ind. Appl.*, vol. 28, no. 4, pp. 921--937, Jul./Aug. 1992
[6] Alberto Bellini, Amine Yazidi, Fiorenzo Filippetti, Claudio Rossi and Gérard-André Capolino, „High Frequency Resolution Techniques for Rotor Fault Detection of Induction Machines", *IEEE Trans. Ind. Applicat.*, vol. 55, no.12, pp. 4200-4209, Dec 2008.
[7] M. Haji and H. Toliyat, ''Pattern recognition-----A technique for induction machines rotor broken bar detection'' , *IEEE Trans. Energy Convers.*, vol. 16, no. 4, pp. 312--317, Dec. 2001.
[8] Hugh Douglas, Pragasen Pillay, Alireza K. Ziarani, „A New Algorithm for Transient Motor Current Signature Analysis Using Wavelets", IEEE Transactions on Industry Applications, vol. 40, no. 5, september/October 2004.