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REMOTE CONTROL HUMLESS FAN CONTROLLER UNIT

A dissertation submitted to the
Department of Electrical Engineering, University of Moratuwa
in partial fulfillment of the requirements for the
degree of Master of Science.

By

MAHATHANTHILAGE DON AJITH KUMARA WIJERATHNA

Supervised by: Dr. J.P. Karunadasa

Department of Electrical Engineering
University of Moratuwa, Sri Lanka

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DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated,

It has not been accepted for any degree, and is also not being concurrently submitted to any other degree.

M.D. Ajith Kumara Wijerathna

Date: 18/02/2011

I endorse the declaration by the candidate.

18/02/2011

Dr. J.P. Karunadasa

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Abstract

Domestic fans are a widely used appliance all around the world. There are several types of fan controllers available for the speed controlling of the fans. Since the cost is a dominant factor when the relevant market is concerned, low cost fan controllers are popular among them even though there are several drawbacks. This thesis discusses design and implementation of a utility friendly hum less remote control fan controller unit at an affordable price.

Electronic fan controllers are used due to the compact design and the low cost. It allows speed reduction through out the range. Most of the available fan controllers use voltage controlling while keeping the frequency constant to control the speed. The mostly available dimmer circuits consist of Triacs as the switching device. Wave form is chopped by an electronic circuit to reduce the line voltage. This generates low order harmonics which affect the utility power while making irritating noise especially at low speeds.

The proposed system designed with a power circuit with power IGBTs as the switching device which uses microprocessor based control system as the signal generator. The algorithm is developed under Harmonic Elimination PWM scheme which switches the power circuit in firing angles which avoids low order harmonics at the predefined speed levels.

The designed system fire the power IGBTs at pre defined firing angles at selected speed levels. It avoids the 3^{rd} 5^{th} and 7^{th} order harmonics below 80% of the line voltage at the operation while avoiding 3^{rd} and 5^{th} above 80% of the line voltage. This reduces the irritating noise and the speed pertabations at the low speed while ensuring a linier speed control action with utility friendly operation.

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