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A Study on Supplying High Frequency to Run the Induction Motor at Accurate Speed with PWM Technique

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***Abstract:** This proposed system is to control the speed of single phase induction motor by PWM technique. This technique has high productivity to drive an induction motor utilizing pulse width modulation technique (PWM) and is intended for insignificant cost. The circuit is controlled by utilizing LabVIEW Software with Arduino (Atmel 328) controller. The reason of utilizing LabVIEW space is of its solid interface, effortlessness of its Graphical Programming Code joined with worked in instruments planned particularly to test, estimating and controlling. With PWM technique it is skilled of providing high recurrence to run the induction motor at precise speed. Through DAQ the signal is gained and the system is controlled.*
***Index Terms:** Optocoupler, Atmel328 controller, LabVIEW, Induction motor, DAQ.*

I. INTRODUCTION

Induction motors are by and large used as a piece of mechanical and business utility applications. It picked up force on account of its high effectiveness and different speed ranges. Contrast with DC machines, AC machines are for the most part utilized as a part of assortment of uses because of their straightforwardness and ease. Motor control applications traverse everything from private clothes washer, fans, footing control system and different mechanical drives. LabVIEW is a graphical programming code for information obtaining, examination, and introduction. The parts of LabVIEW are front board and square graph. Front board is utilized to construct controls and markers and piece outline contains pictorial portrayal of code. In this work LabVIEW based control is intended to control the speed of induction motor utilizing PWM technique. Dynamic attributes of electrical machines are learnt utilizing recreation devices accessible in LabVIEW. Use of virtual instrumentation software to investigate and control isn't just subjected to cost decrease yet additionally gives upgraded execution.

II.BLOCK DIAGRAM

The system existing is comparable as that of speed control utilizing voltage control technique in which voltage is changing from zero to most extreme esteem. Here Pulse width modulation technique to control the speed of induction motor is proposed which creates the lower arrange music. In the Figure 1, the PWM controlled MOSFET is associated in arrangement with connect rectifier and the contribution of extension

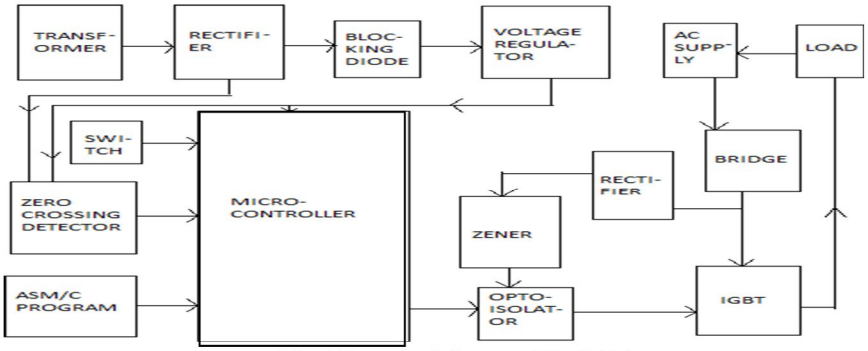

Fig.1 Proposed System Block Diagram

rectifier is associated in arrangement with stack and te yield terminal is associated crosswise over power transistors. At first its well established certainty that current can't move through the open circuit in this manner control transistor is in OFF state. In the event

that the scaffold rectifier circuit is short circuited, the power transistor gets exchanged ON and current moves through the rectifier to stack. The ability to the heap is controlled by changing the obligation cycles of PWM pulses. The pulses are synchronized with supply phase by zero detecting point.

III. HARDWARE SYSTEM

A. Labview

LabVIEW programs are called virtual instrumentation (VI) on the grounds that their appearance and activity mimic physical instruments, for example, oscilloscopes and Multi Meters. LabVIEW is a graphical programming code used to get, control and store information. It is conceivable to speak with equipment by utilizing DAQ, RS232 interface. At whatever point the serial port is prepared to transmit information, it brings information to equipment cushion. The controller gets information through the interfacing devices and the motor is controlled by changing the pulse width modulation.

B. ATMEL 328

The superior, low-control Atmel 8-bit AVR RISC-based microcontroller contains 1KB SRAM, 16KB ISP streak memory, a 8-channel/10-bit A/D converter (TQFP and QFN/MLF), 512B EEPROM and investigate WIRE for on-chip troubleshooting. The gadget bolsters a throughput of 20 MIPS at 20 MHz and works between 2.7-5.5 volts. By executing capable directions in a solitary clock cycle, the gadget accomplishes throughputs moving toward 1 MIPS for every MHz, adjusting power utilization and handling speed.

C. Opto-Couplers

Opto-couplers are comprised of a light radiating gadget, and a light touchy gadget, all wrapped up in one bundle, yet with no electrical association between the two, only a light emission. The light producer is almost dependably a LED. The light delicate gadget might be a photodiode, phototransistor, or more obscure gadgets, for example, Thyristors, TRIACs and so forth. A considerable measure of electronic hardware these days is utilizing opto coupler in the circuit. A pick coupler or now and then allude to as select isolator enables two circuits to trade flags yet remain electrically disconnected. This is typically proficient by utilizing light to hand-off the flag. The standard select coupler c0ircuits configuration utilizes a LED sparkling on a phototransistor-for the most part it is a NPN transistor and not PnP. The flag is associated with the LED, which by then shines on the transistor in the IC Most ordinarily utilized is an opto-coupler MOC3021 a LED Diac compose blend. This IC is interfaced with a microcontroller and a LED is associated in arrangement to the IC, which sparkles to show a rationale High heartbeat from the microcontroller so we can realize that present is streaming in inner LED of the opto-IC. At the point when rationale high is given current moves through LED from pin1 to 2. So in this procedure LED light falls on DIAC causing 6 and 4 to close. Amid every half go current courses through entryway, arrangement resistor and through opto-diac for the fundamental Thyristors/triac to trigger for the heap to work.

D. Ssr-Solid State Relay

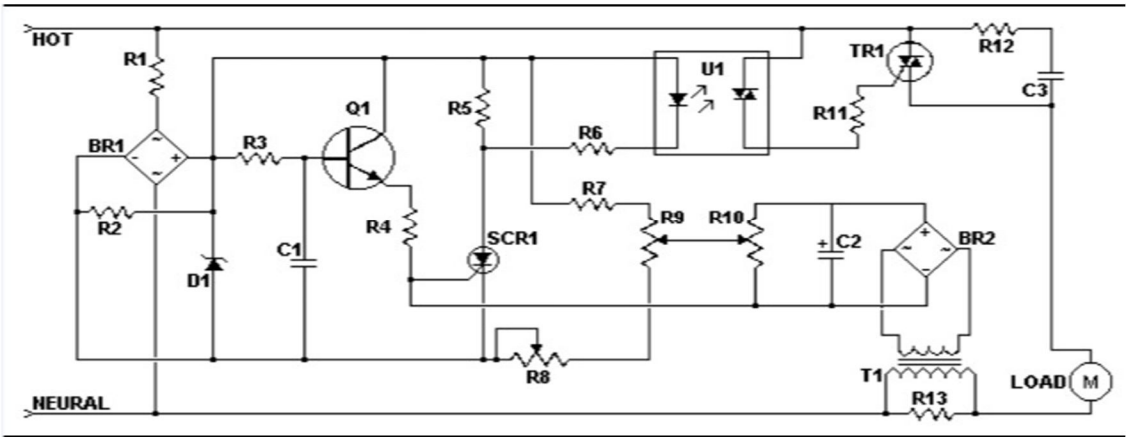

Fig.2 SSR Circuit diagram

SSRs have no mobile contacts. SSRs are not altogether different in activity from mechanical relays that have portable contacts. SSRs, be that as it may, utilize semiconductor exchanging components, for example, thyristors, triacs, diodes, and transistors.

Besides, SSRs utilize optical semiconductors called photograph couplers to segregate information and yield signals. Photocouplers change electric signals into optical signals and relay the signals through space, in this way totally disconnecting the data and yield fragments while relaying the signals at quick. SSRs contain electronic parts with no mechanical contacts.

IV. SIMULATION RESULT

Figure 3 shows the front board of LabVIEW in running state of the induction motor. Variety of speed as for time controlled by PWM techniques is appeared in Figure 4. It unmistakably demonstrates that the speed of the motor achieves the appraised speed inside the brief length and it organized in the Table 1.

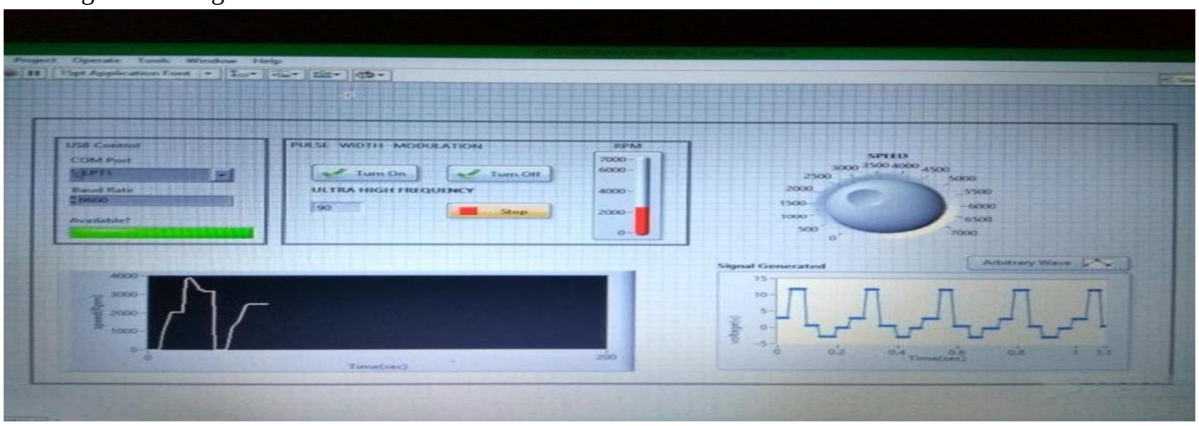

Fig.3 Front panel at running condition

Table1. Speed Vs Time

Speed (rpm)	Time (ms)	Frequency (UHZ)
1000	10	36
2000	20	73
3000	30	108
4000	40	145
5000	50	185

V. GRAPHICAL RESULTS

A. *Proposed System*

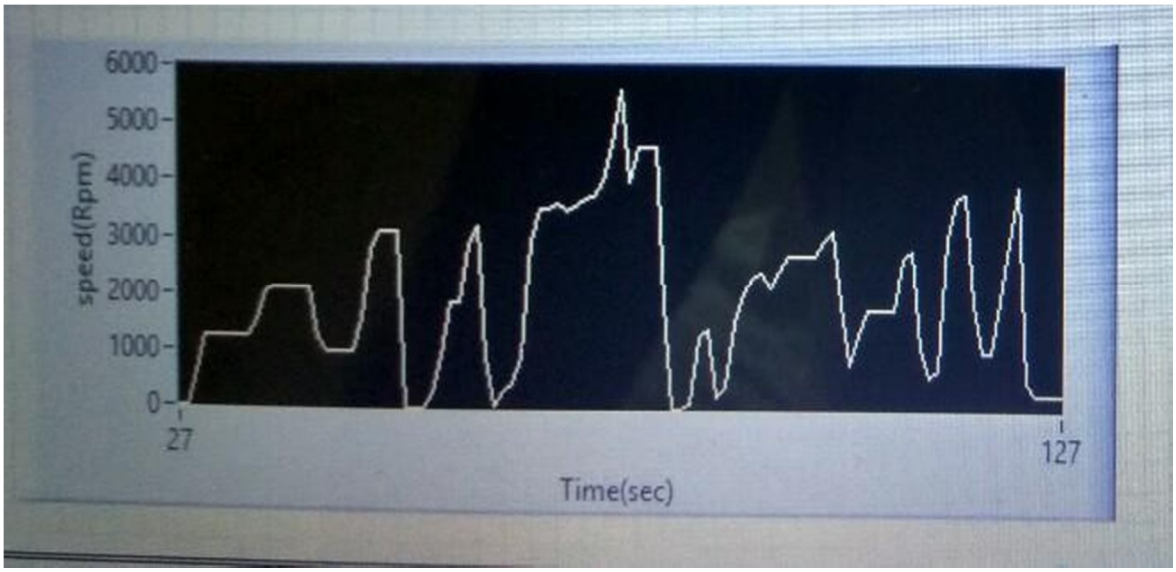

Fig.4 Graphical representation of user speed control with respect to time

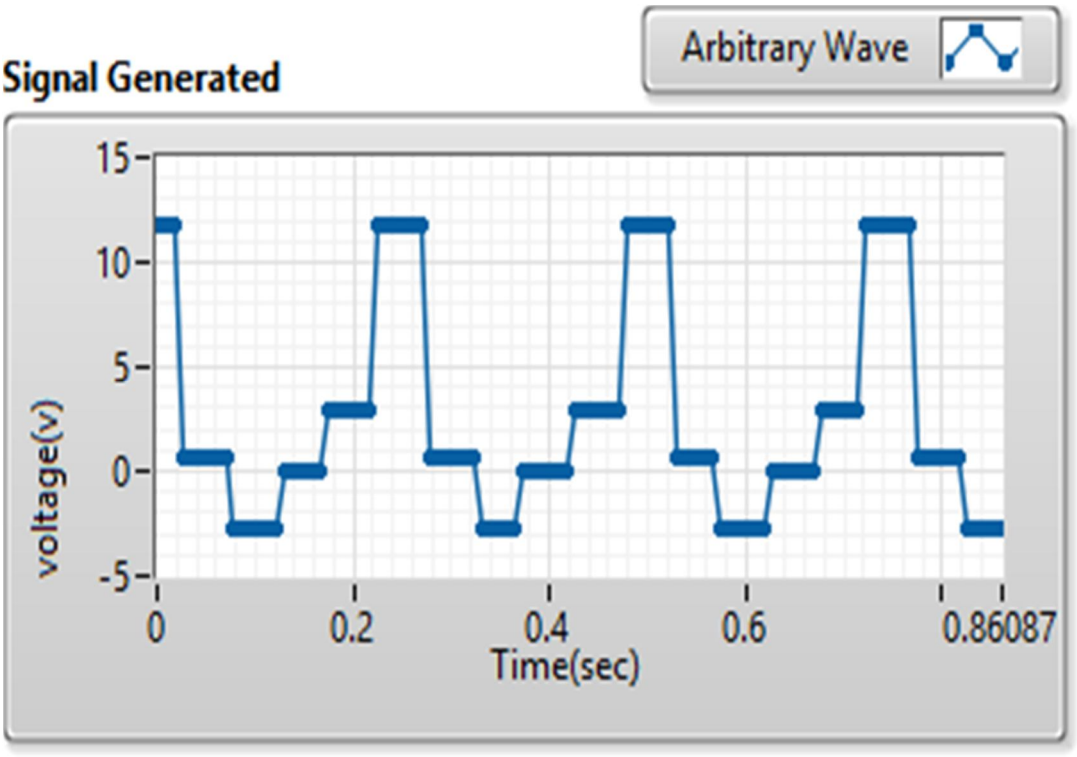

Fig.5 Graphical representation of PWM wave

VI. CONCLUSION

LabVIEW based speed control of single phase induction motor using pulse width modulation technique is in every way more 31% more gainful when differentiate and existing framework. The correct speed can be refined by using this strategy. By using this procedure customer can control the speed of induction motor as demonstrated by the necessities.

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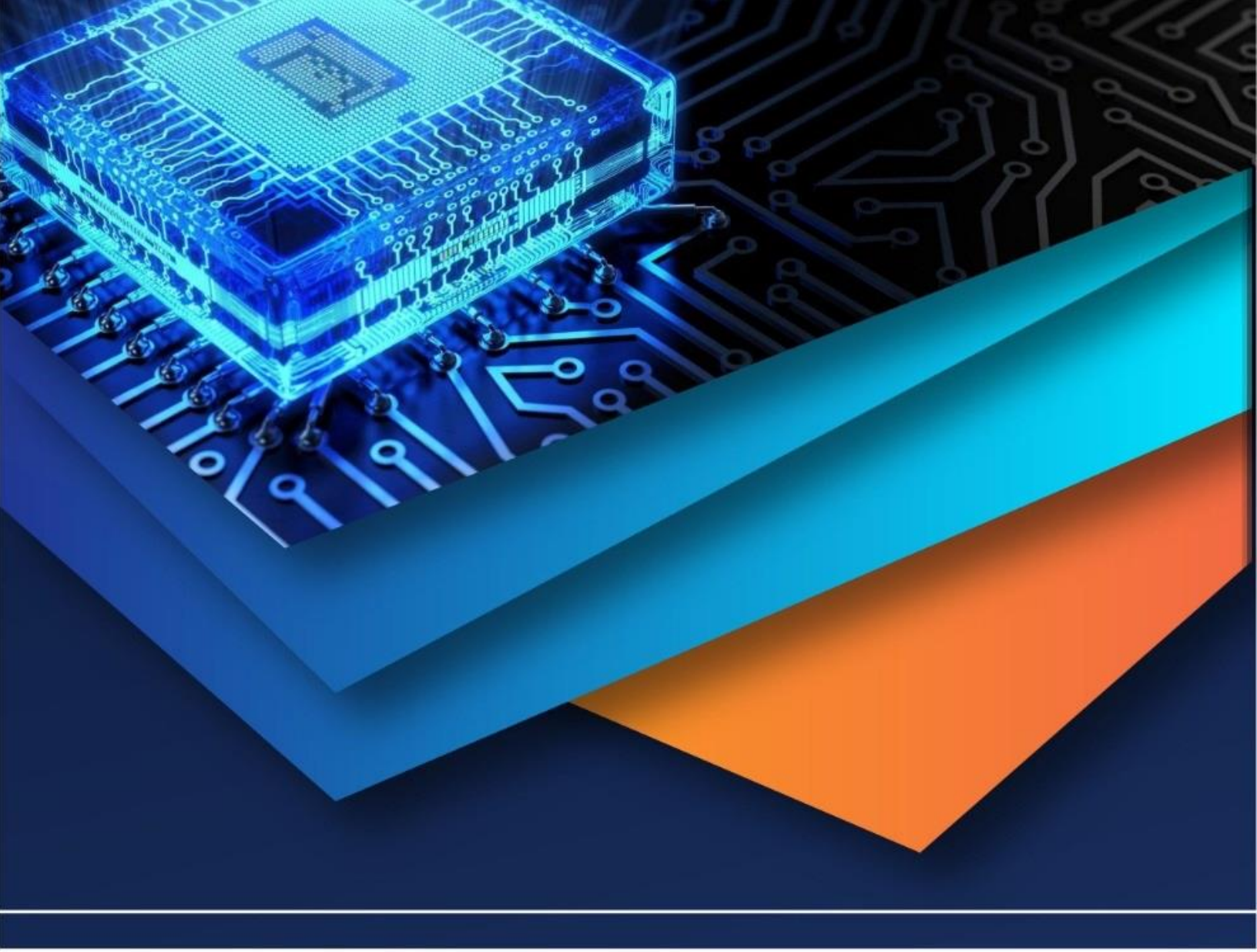

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