**Single Phase Inverter Using Arduino**

**ABSTRACT**

 In normally speed control of induction motor has been easier by using of microcontroller and semiconductor devices. This project is used to vary the pulse width modulation (pwm) signals by using arduino controller. The firing pulses of IGBT’s are varied .the firing pulse is given to the driver board and control the pulses. Speed control of a single phase induction motor is implemented using Arduino Uno controller. Arduino Uno controller is connected to the PWM inverter. The single phase inverter using arduino output will be compared.

**EXISTING SYSTEM:**

Induction Motors are widely used in many industrial applications due to its simple construction and low maintenance cost. However IM motors are difficult to control over its speed characteristics as it is directly dependent on frequency of the supply, it can be done using voltage control system but however is not very convenient and finely controllable. The system designed in the project developed a voltage/frequency drive system that controls the speed of the motor by varying the speed of the ac supply. To control the speed of single phase induction motor we generally use V/F control strategy. The different methods available for the speed control of an induction are pole changing, frequency variation, variable rotor resistance, variable stator voltage, constant V/f control, slip recovery method etc., the constant V/f speed control method is the majority used. In this method, the V/f ratio is kept constant which in turn maintains the magnetizing flux constant so that the maximum torque remains the same. In constant V/f control with PWM method we can vary the supply voltage as well as the supply frequency such that the V/f ratio remains constant so that the fluxremains constant too. So, we get different operating zone for various speeds and torques and also we get different synchronous speed with almost same maximum torque. Thus the motor is use full and we have a good variation of speed control. It is effortless, cost-effective to easier to design in open loop. But the drawbacks of open loop is it doesn’t correct the change in output also it doesn’t reach the steady state quickly.

**PROPOSED SYSTEM**

 The ac drive system consists of a supply unit, rectification block, gate driver unit, inverter block and the load.The supply is given from 230V, IΦ. The step down transformer of (230V/12V) is used to step down the supply voltage to 12 V AC. Output of the transformer is given to the bridge rectifier which coverts it into 12 V DC.12 V dc voltage is passed through a voltage regulator circuit (IC7812) and thus constant 12 V dc voltage is fed as input to the H-bridge inverter. An arduino Uno is programmed to give PWM pulses to the H-bridge inverter. The pulses are varied using a potentiometer. So, for the constructed system the frequency range from 14.85Hz to 60Hz for variable voltage to change the speed of induction motor.

**BLOCK DIAGRAM:**

****

**HARDWARE & SOFTWARE REQUIREMENTS**

**HARDWARE DETAILS**

* PIC microcontroller(PIC16F877A)
* Driver Board

**SOFTWARE DETAILS**

* Matlab/Simulink
* Arduino

**ADVANTAGES:**

* Easy to control the pulses
* Low cost

**APPLICATIONS:**

* Speed control
* Voltage control applications

**CONCLUSIONS:**

Thus the single phase inverter using arduino control is gives an energy efficient and environment friendly solution. The arduino pulse will be given to the H-bridge inverter, so the switching speed will be controlled by using pulse width modulation (pwm). The speed of the motor will be varied by varying the pwm signals.

**REFERENCES:**

[1] Atul M. Gajare, Nitin R. Bhasme “A Review on Speed Control Techniques of Single Phase Induction Motor” International Journal of Computer Technology and Electronics

Engineering (IJCTEE) Volume 2, Issue 5, October 2012.

[2] Chaitanya N.Jibhakate, Asstt.Prof.(Mrs.)Vijaya Huchche “Speed Control of Single Phase

Induction Motor Using Micro-Controller “International Journal of EngineeringResearch and Applications (IJERA) ISSN: 2248-9622 International Conference on Industrial Automation and Computing (ICIAC-12-13thApril 2014).

[3] G.Swapna, V.HimaBindu, M.Chakravarthy, P.M.Sarma“Hardware Implementation of a

Single Phase Inverter” International Journal of Engineering Trends and Technology (IJETT) – Volume 4 Issue 8- August 2013.

[4] R.Suneeth, P.Usha “Speed Control of Single Phase Induction Motor Using AC Chopper by Asymmetrical PWM Method” International Journal of Advanced Research in Electrical,

Electronics and Instrumentation Engineering (AnISO 3297: 2007 Certified Organization) Vol. 3, Issue 10, October 2014.

[5] M.Syed Jarnil Asghar “Smooth Speed Control of Single-phase Induction Motors by Integral-Cycle Switching”IEEE Transactions on Energy Conversion, Vol. 14, No. 4, December 1999.

**DEMO VIDEO:**

 <https://youtu.be/fXV_dYjQFTg>