

FREQUENCY SINUS SOURCE

Purpose of the paper

- Design and of a practically realized on variable frequency sinus *source*
- *The source generated sinusoidal voltage with amplitude from 0 to 220 V and frequency from 0 to 100 Hz or 0 to 400Hz.*

- The solution is based on the EG8010 integrated circuit and driver circuit IR2010s
- Design is converter based on EG 8010 in mode on constant voltage and variable frequency
- *Control electronics operate IGBT transistors in the topology of full bridge*

The electronics converters used to control in power actuators (motors, heating devices) at the output generate voltage and current with a square waveform or waveform which in the first approximation is a modified sine wave.

Therefore, there is a harmonic distortion of the output voltages and currents at these power sources. This causes a reduction in the power factor and the efficiency of the source.

One of the main tasks of electronics it deals with this issue is the design of electronic components and devices that will provide a sine wave form of the output voltage and current of the hapower source.

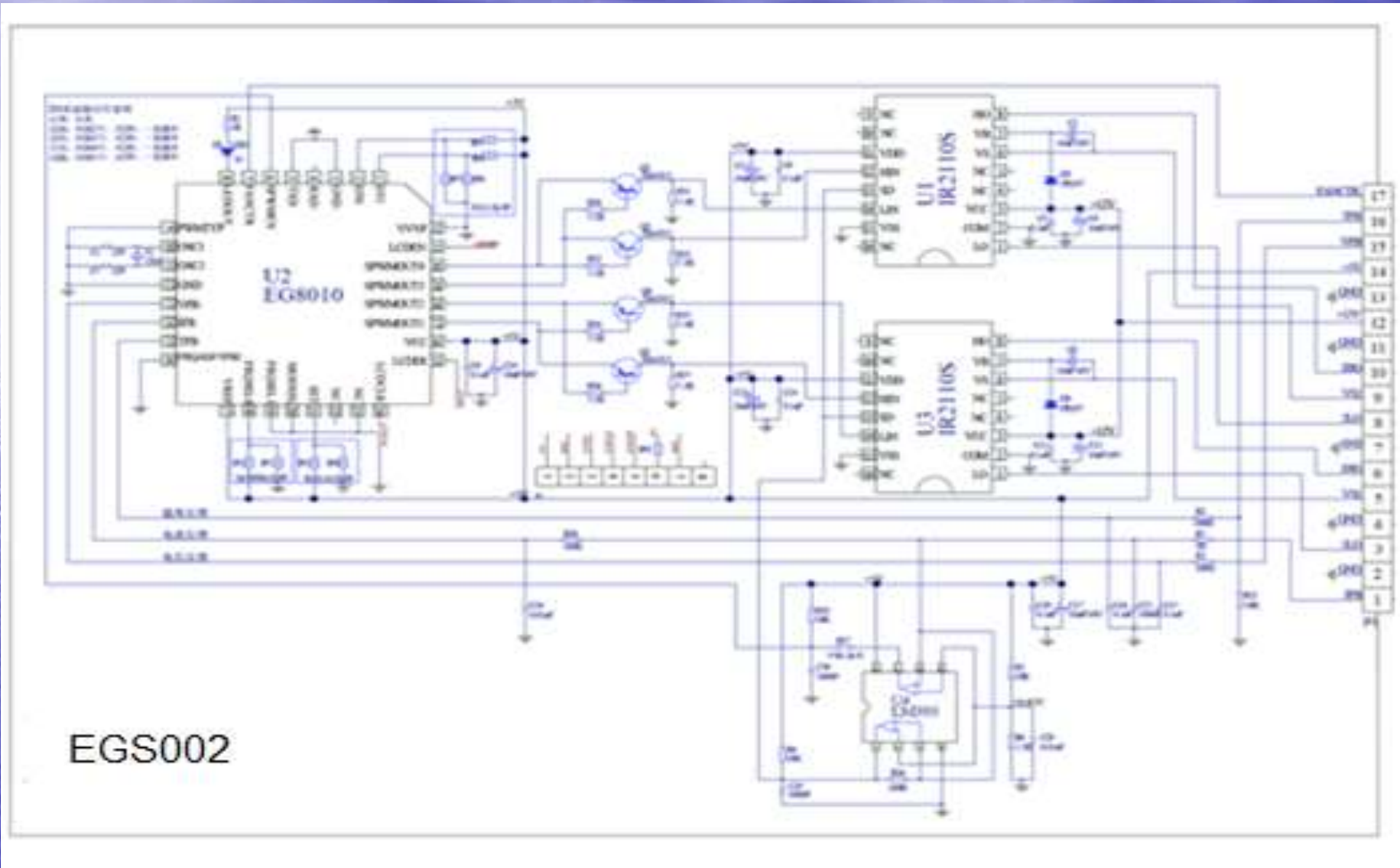
On the other hand electronic devices that control converters that drive induction motors, need to provide a variable frequency waveform. This is in line with the requirement for the induction motors to run at a constant torque, ie the operation of the motor at a constant torque requires the V/f ratio to be constant.

A sinusoidal wave source is also required and for laboratory research.

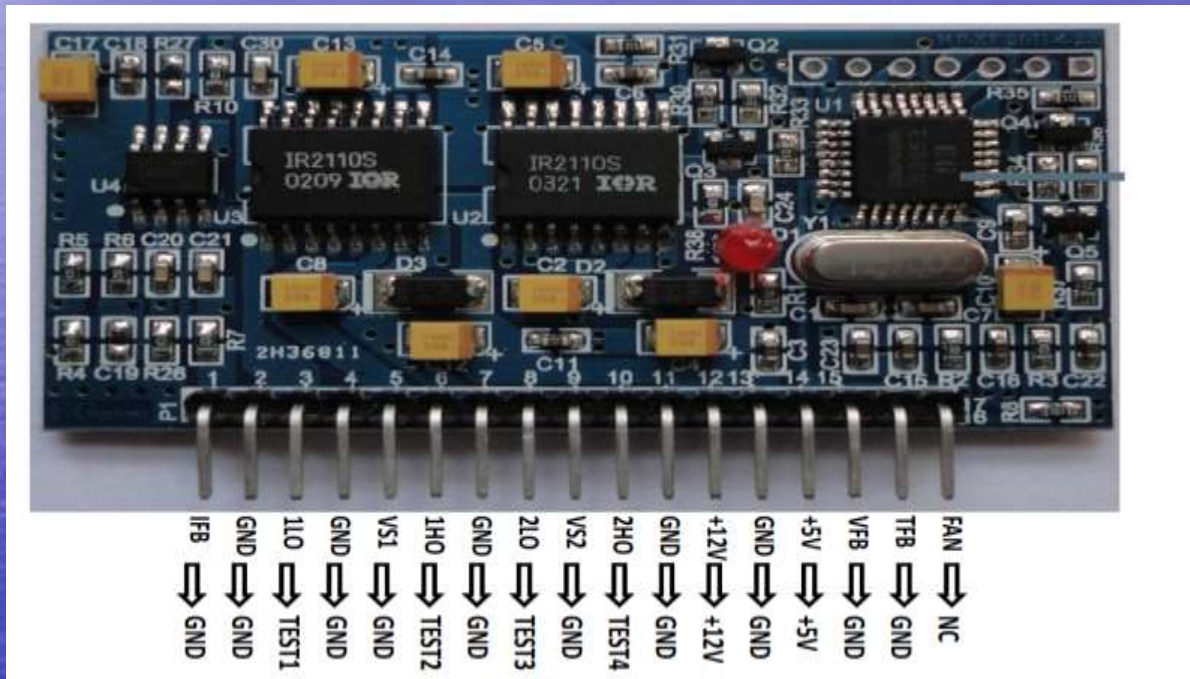
There are mainly two directions of development of integrated circuits that are used in the power electronics. On one side are microcomputers and on the other side are typical integrated circuits designed for special purposes

In this paper we want to verify the possibility of using an sinus source based on special circuit that, in variable frequency and amplitude conditions, gives optimal results comparable to a normal inverter system, with the difference that this system uses a low-cost microcontroller. Frequent sine source is based on SPWM technique and SPWM signal

Electrical circuit on the board EGS002 with build IC EG8010 and driver IRF2110



Electronic board EGS002 with build IC EG8010 and driver IRF2110



EG8010 has two frequency modes: constant frequency mode and adjustable frequency mode.

In adjustable frequency mode, EG8010 only uses unipolar modulation, and pin (20)MODSEL has to connect to low level. Pins FRQSEL1 and FRQSEL0 set the frequency mode.

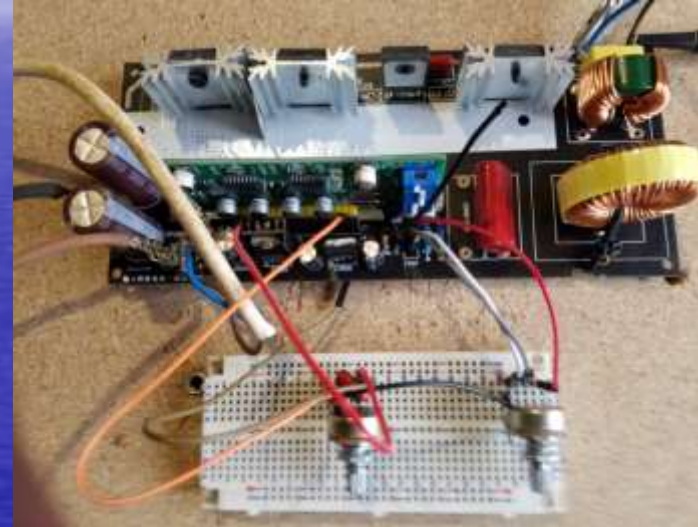
In constant frequency mode, constant mode. Pin (16) is used as VFB2 voltage feedback circuit under bipolar modulation.

In adjustable frequency mode, "10" outputs frequency in range of 0-100Hz and "11" outputs has in range of 0-400Hz.

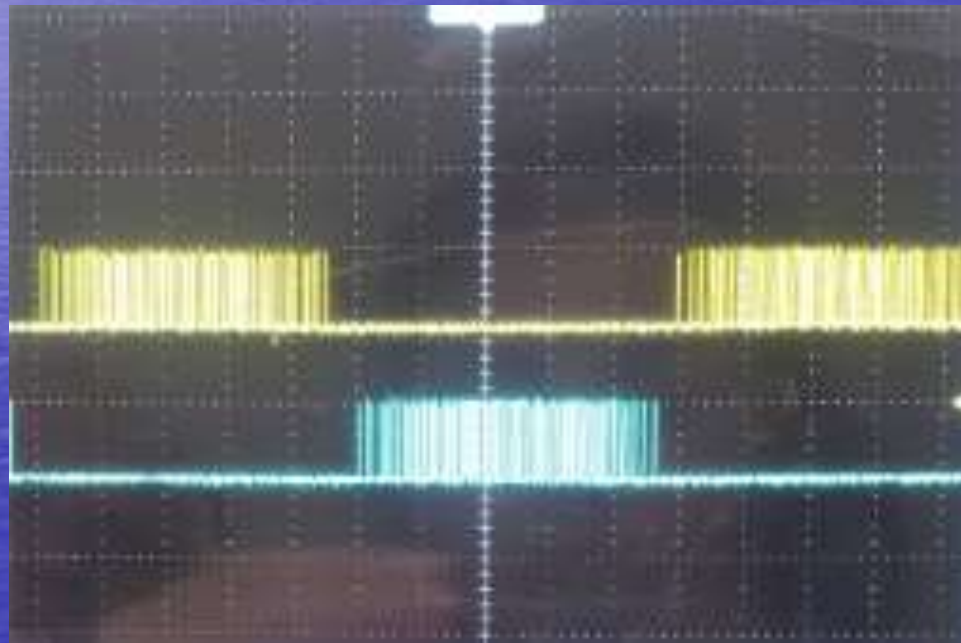


Experimental results

Prototype of practically realized a frequency sine source:
in the manufacturing phase and finished device



PWM waveform on the output SPWMOUT3 and SPWMOUT4 horizontal is 4 ms/div and vertical is 5 V/div



Oscillograms from the work of the frequency sine source:
3 Hz, horizontal div is 200 ms, 16 Hz, horizontal div is 20 ms, 25 Hz, horizontal div is 8 ms, 44 Hz, horizontal div is 8 ms, 69 Hz, horizontal div is 8 ms, 100 Hz, horizontal div is 8 ms



Oscillograms from the work of the frequency sine source: 135 Hz, horizontal div is 2 ms, 217 Hz, horizontal div is 2 ms, 305 Hz, horizontal div is 2 ms



Conclusions

- The paper analyzes the application of a special integrated circuit which controlling inverter to generate sine voltage
- The characteristics of the circuit are given and the advantages of its application in relation to the inverters controlled by microcomputer are emphasized.
- Designed and experimentally is realized prototype on frequency sine source controlling by this circuit
- The operation of the circuit is verified with oscillograms and data, obtained from measurements of the practically realized prototype