International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356

Journal Website: http://sciencebring.com/index.php/ijasr

Research Article

INVERTER MODELING IN IMPROVING THE ENERGY EFFICIENCY OF A MOBILE UNINTERRUPTED SUPPLY SOURCE

Submission Date: November 05, 2022, **Accepted Date:** November 15, 2022,
Published Date: November 30, 2022
Crossref doi: https://doi.org/10.37547/ijasr-02-11-11

M.R. Madaminov
Master's Student, Fergana Branch Of Tuit, Fergana, Uzbekistan

X.T. Yuldashev
Doctor Of Philosophy (Phd) In Physics And Mathematics Sciences, Associate Professor, Fergana Polytechnic Institute, Fergana, Uzbekistan

ABSTRACT

In the work in the MATLAB program, an IGBT-transistor inverter was modeled to improve the energy efficiency of a mobile uninterruptible power supply. In order to improve the efficiency of the uninterruptible power supply, its principal and structural diagrams have been developed.

KEYWORDS

Electronic device, MATLAB program, IGBT transistor, simulation, inverter, harmonic analysis, spectral analysis.

INTRODUCTION

In power supplies that consume direct current sources, for example, batteries, solar cells, etc., transistor converters are considered the main functional node that converts one nominal DC voltage into a different nominal DC voltage and its polarity. These switches are galvanically isolated from the primary supply bus. Also, transistor voltage converters are considered central

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356
ISSN-2750-1396

functional nodes in transformerless input power sources. These voltage converters can also consume energy from the AC network. Also, one-cycle and two-cycle transistor constant voltage converters are used in power sources [1-4].

In increasing the efficiency of any electronic device, the operating conditions, load and elements of this device are of great importance. In order to improve the efficiency of the mobile uninterruptible power supply source, taking into account its operation time, the sinusoidal nature of the output voltage, and the provision of high-quality energy supply to devices, the inverter was modeled in the MATLAB program, the necessary transistor was selected, and a high-quality voltage was obtained at the output. [1-4]

Converters that convert direct current into alternating current and operate on an autonomous load are called inverters. Depending on the number of voltage phases at their outputs, they are divided into: single, three, multi-phase inverters. Depending on the construction of the circuits, they are divided into zero-removed, bridge-type and semi-bridge-type [5-6].

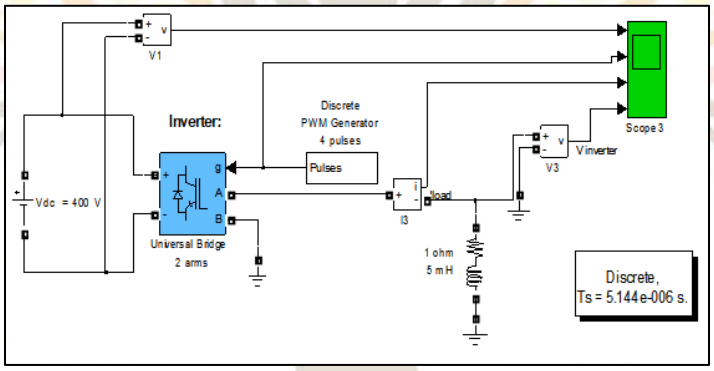


Figure 1. Modeling scheme

Modeling of IGBT transistor inverters. Model universal bridge and frequency (1080 Hz) and modulyatsya index (0.8) selected PWM pulse generator is found externally from discrete blocks. Harmonic analysis is performed using the Powergui/FFT tool (Figure 2).

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356
ISSN-2750-1396

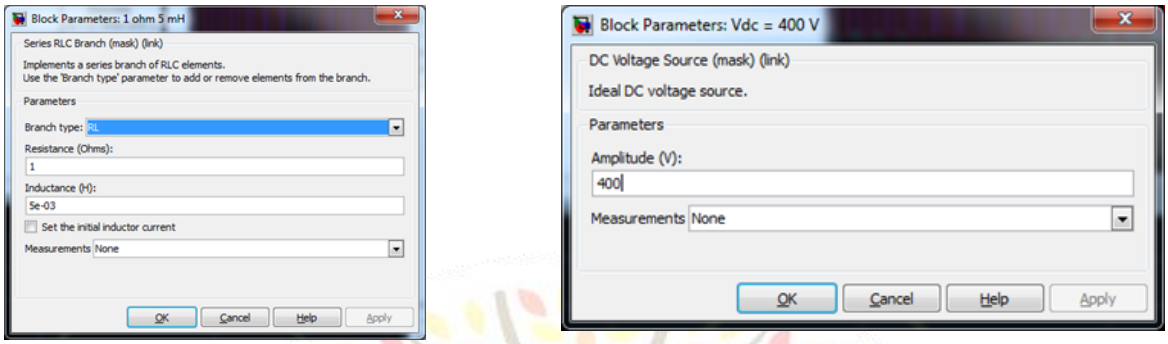
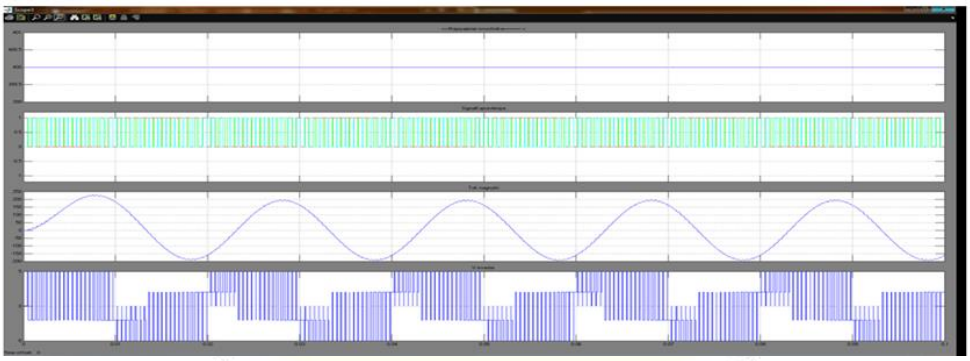


Figure 2. Bridge and control signal parameters

The installed parameters of the load and the source are presented in Figure 3. The input and output oscillograms of the inverter signals obtained as a result of modeling are presented in Figure 3.

Now, to perform the electrical calculation, first of all, it is necessary to work with the initial data, these are the voltage of the supply source (in our case, the car battery): U0=12 V; transformer output voltage UKE=25 V; the maximum current of the secondary winding I2=2 A; the generation frequency of the converter is f=10 kHz [7-13].



International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356
Crossref doi Google Scholar METADATA INDEXING WorldCat MENDELEY
ISSN-2750-1396

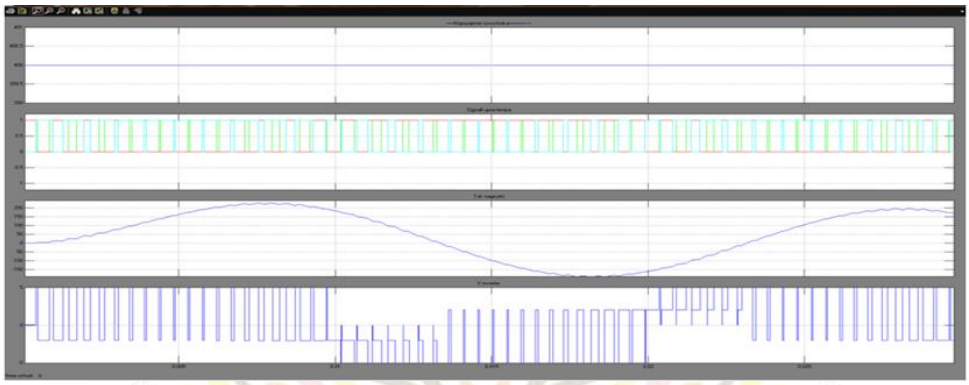


Figure 3. Input and output oscillograms of inverter signals

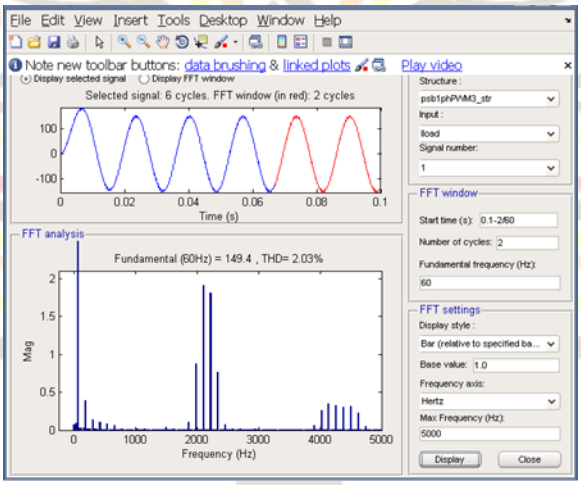


Figure 4. Spectral composition of inverter output signals

After modeling, spectral analysis can be performed in the range from 0 to 5000 Hz. (Figure 4).

Tests have shown that if the AB is correctly connected to the device, the mains voltage is not allowed to be connected to the inverter output, and the load is connected with a suitable power, the backup power supply has a continuous working life and does not require additional maintenance. can't. The device must always be connected to the mains voltage. AB is automatically disconnected from the charging circuit of a fully saturated battery, and when the voltage decreases, it is connected to the charging device again. If there is no voltage in the network for a long time, it is partially charged from the AB solar battery during daylight hours. The test results showed the following:

1. When there is no voltage in the network and 90 A/s, AB is used as the primary energy source, the reserve supply source of 300-350 W keeps the device in working condition for 2.5-3 hours.

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356
ISSN-2750-1396

2. On an outdoor day, a 100 W solar battery restores (40÷50%) the energy used by AB for 6-7 hours.

3. In field conditions, in the absence of a voltage network, the capacity of the solar battery is 2-3 times, the AB capacity is 300 A/s. it would be appropriate to raise it to

From this tested mobile uninterruptible power supply, with the appropriate selection of AB capacity, solar battery and inverter power, telecommunications communication, radio stations, medical systems, household radio electronic equipment and also control systems of complex technical objects can be supplied with quality power. can be used for supply.

REFERENCES

1. Yuldashev, K. T., & Akhmedov, S. S. (2021). Physical properties at the contact semiconductor-Gas discharge plasma in a thin gas discharge cell. Asian Journal of Multidimensional Research, 10(9), 569-573.
2. Yuldashev, H. T., & Mirzaev, S. Z. (2021). Investigation of background radiation and the possibility of its limitation in a semiconductor ionization system. ACADEMICIA: An International Multidisciplinary Research Journal, 11(4), 1364-1369.
3. Yuldashev, K. T., Tillaboyev, A., & Komilov, A. (2020). XI Sotvoldiyev Transition photoelectric processes in a superfluid gas-discharge cell with semiconductor electrodes. Academicia: An International Multidisciplinary Research Journal, T10.
4. Yuldashev, K. T. (2020). Research photoelectric and photographic characteristics of the converter of the image of the ionization type. Scientific Bulletin of Namangan State University, 2(10), 16-22.
5. O.S. Rayimjonova, Kh.T. Yuldashev, U.Sh. Ergashev, G.F. Jurayeva, L.R. (2020). Dalibekov Photo Converter for Research of Characteristics Laser IR Radiation. International Journal of Advanced Research in Science, Engineering and Technology.7(2), pp. 12788-12791.
6. Yuldashev, K. T., Akhmedov, S. S., & Ibrohimov, J. M. (2020). Damping cell from gallium arsenide with plasma contacts in an extreme gas discharge cell. Journal of Tashkent Institute of Railway Engineers, 16(1), 36-41.
7. Yuldashev, K., Akhmadaliev, B., Ahmedov, S., & Ergashov, K. (2020). Analysis of kinetics of image formation on bismuth films under action of gas discharge. Theoretical & Applied Science, (4), 839-843.
8. Rayimjonova, O. S. (2022). Investigation of cluster-type inhomogeneity in semiconductors. American Journal of Applied Science and Technology, 2(06), 94-97.
9. Jurayev, N. M., & Turgunov, B. A. (2020). Requirements for telecommunication systems in the development of telemedicine in Uzbekistan. Scientific

International Journal of Advance Scientific Research
(ISSN – 2750-1396)
VOLUME 02 ISSUE 11 Pages: 77-82
SJIF IMPACT FACTOR (2021: 5.478) (2022: 5.636)
METADATA IF – 7.356

Bulletin of Namangan State University, 2(1), 138-144.

10. Jurayev, N. M., & Xomidova, N. Y. (2020). Safety evaluation of cryptography modules within safety related control systems for railway applications. Cutting edge-science, 197.

11. Jurayev, N. M., Xomidova, N. Y., & Yuldasheva, X. X. (2020). Security analysis of urban railway systems: the need for a cyber-physical perspective. Cutting edge-science, 206.

12. Отажонов, С. М., Жураев, Н., & Алижанов, Д. Д. (2011). Фотодетектор для регистрации рентгеновского и ультрафиолетового излучения. Интерэкспо Гео-Сибирь, 5(1), 107-111.

13. Turgunov, B., Juraev, N., Toshpulatov, S., Abdullajon, K., & Iskandarov, U. (2021, November). Researching Of The Degradation Process Of Laser Diodes Used In Optical Transport Networks. In 2021 International Conference on Information Science and Communications Technologies (ICISCT) (pp. 1-4). IEEE.