



TAKING A ROLE IN THE AUTONOMOUS INDUSTRIAL REVOLUTION 4.0: SPECIAL CASE ON VOLTAGE STABILIZER RESEARCH

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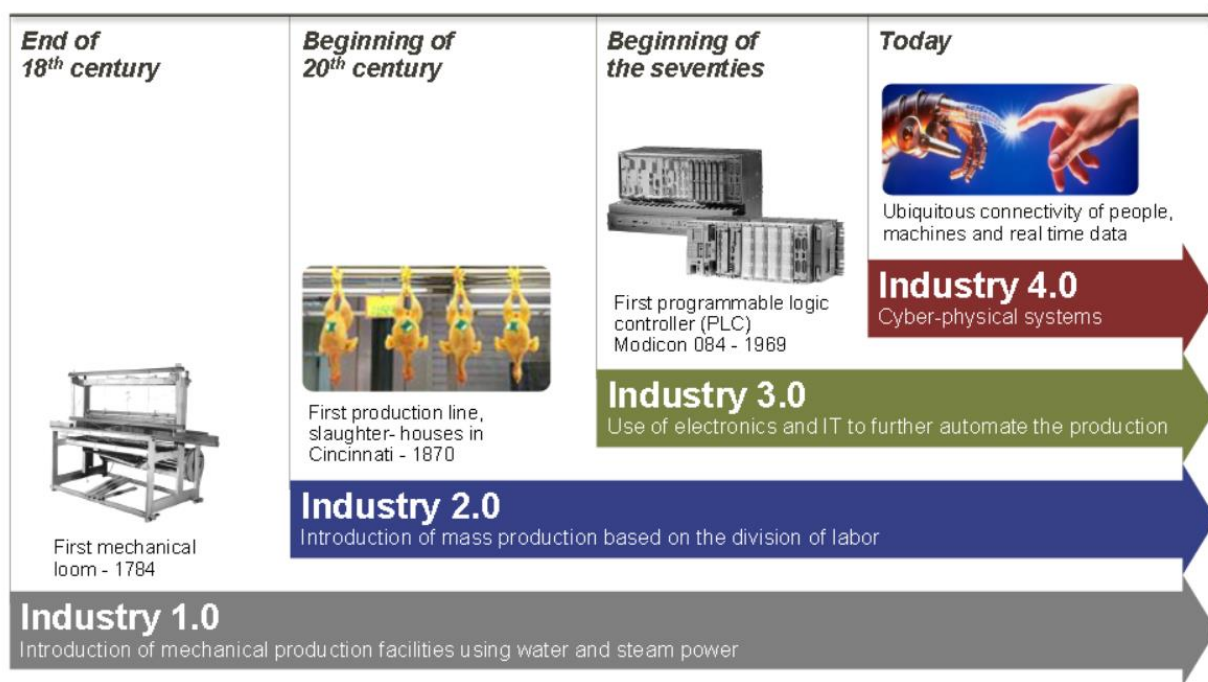
OUTLINE

- Introduction
- What is the IR 4.0?
- The history of industrial revolution
- Making Indonesia 4.0
- Taking a role in MI 4.0: Doing research
- Research on Voltage Stabilizer
- conclusion

Government Regulation No. 63 - 2019

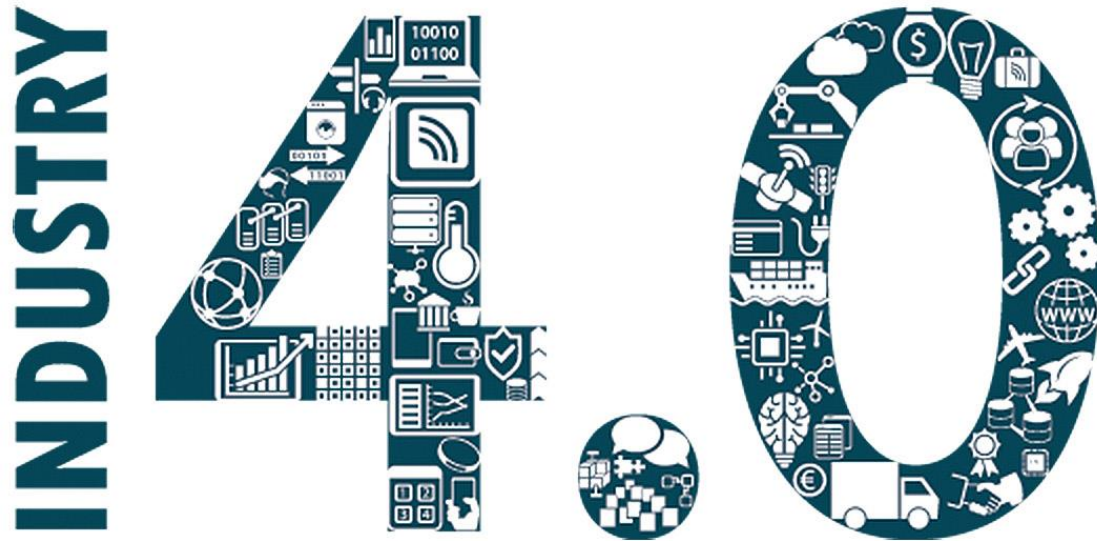
The history of industrial revolution

Industry 4.0 initiative is the global trend in the manufacturing industry



The first industrial revolution was catalyzed by Newton when he formulated his laws of motion. Because from then onwards motion was better understood and quantified, it was possible to design steam engines that mechanized much of the work that was traditionally done by humans. The second industrial revolution was catalyzed by Faraday and Maxwell who unified magnetic and electric forces and this led to electricity generation and electric motor which were instrumental in the assembly lines that have come to dominate many industries. The third industrial revolution was catalyzed by the discovery of a transistor which ushered the electronic age that gave us computers and internet..

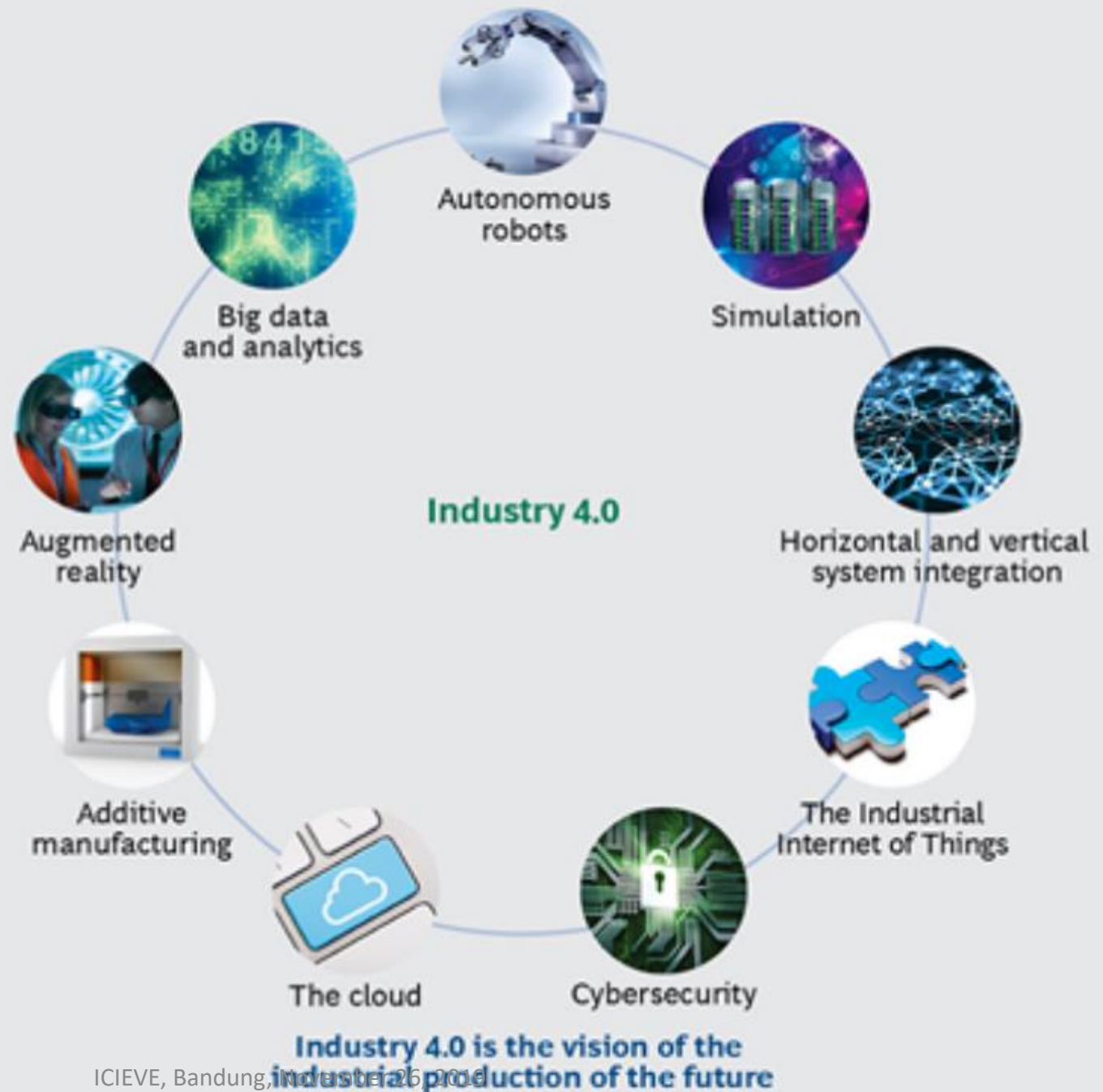
What is The IR 4.0



The fourth industrial revolution known as the cyber-physical system will revolutionize industries so substantially that much of the work that exists today will not exist in 50 years later.

Industry 4.0 describes a future state of industry characterized by through digitization of economic and production flows. It requires horizontal integration at every step in the production process, in interaction with machines. In the globally interconnected world of Industry 4.0, machines also interact with one another.

9 pillars of IR 4.0



Trends of the future: 2025 and beyond

Source: World Economic Forum 2015



- 80% will have unlimited (sponsored) backup space in the cloud



Trends of the future: 2025 and beyond

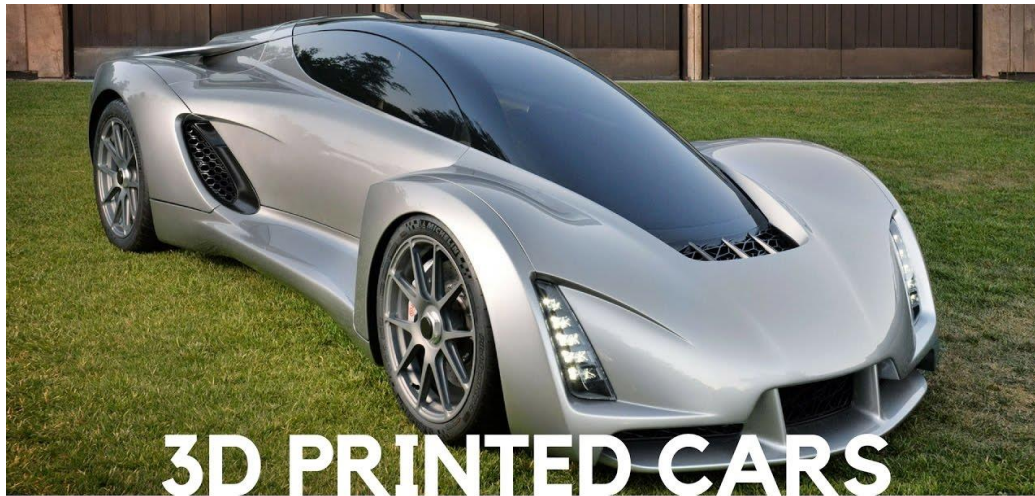


- There will be one trillion sensors connected to the internet



- 80% of the world's population will have Internet presence

Trends of the future: 2025 and beyond



3D PRINTED CARS

Best models you should see

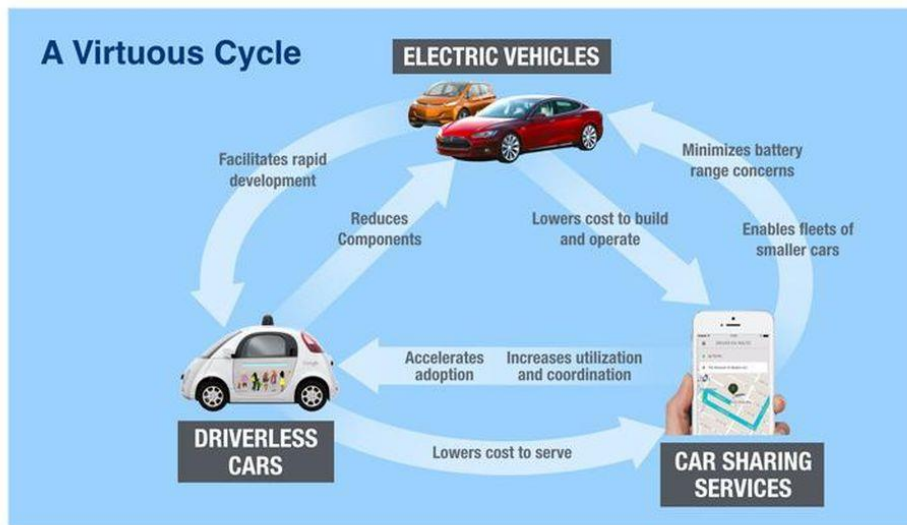
- The first automobile entirely produced with a 3D printer



- 90% of world's population will own a smart phone

Trends of the future: 2025 and beyond

- More rides will be made on shared cars than on private cars
- 10% of all vehicles on the roads will be driverless



Chunka Mui

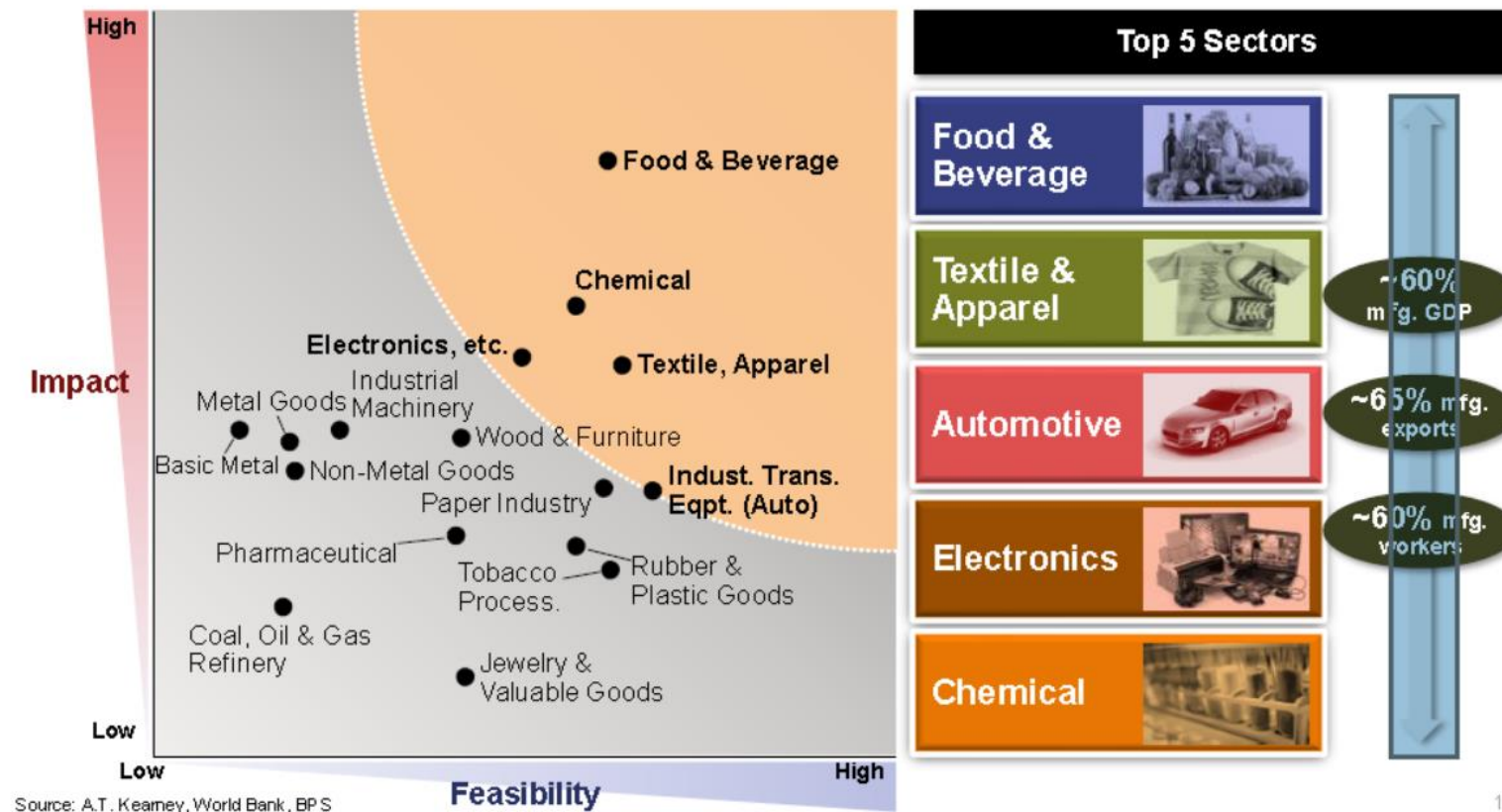


Driverless cars could significantly reduce the cost of car-sharing services like Uber Go-car and Grab by eliminating the largest operational cost—the human driver.



5 sectors for “Making Indonesia 4.0”

Sector prioritization matrix



12

Aspirations for the five focus sectors

1	 Food & Beverages	Founding an ASEAN F&B powerhouse
2	 Textile & Apparel	Becoming a leading “functional” clothing producer
3	 Automotive	Establishing export leadership in ICE and EV
4	 Chemicals	Developing leading biochemical manufacturers
5	 Electronics	Nurturing highly capable domestic champions

Source: A.T. Kearney

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To realize “Making Indonesia 4.0”



5



Electronics

Nurturing highly capable domestic champions

Research on Voltage Stabilizer



A Voltage Stabilizer is an electrical device which is used to provide a constant voltage output to a load at its output terminals irrespective of any change/ fluctuation in the input i.e. incoming supply.

The basic purpose of a Voltage Stabilizer is to protect the electrical/ electronic gadgets (for example – Air conditioning Unit, Refrigerator, TV, etc.) from the probable damage due to Voltage Surge/ fluctuations, Over Voltage and Under Voltage conditions.

Application for Voltage Stabilizer



Home Application



Medical Equipment



Industry Equipment



Stereo Equipment

Why do we need Voltage Stabilizers? – Its Importance

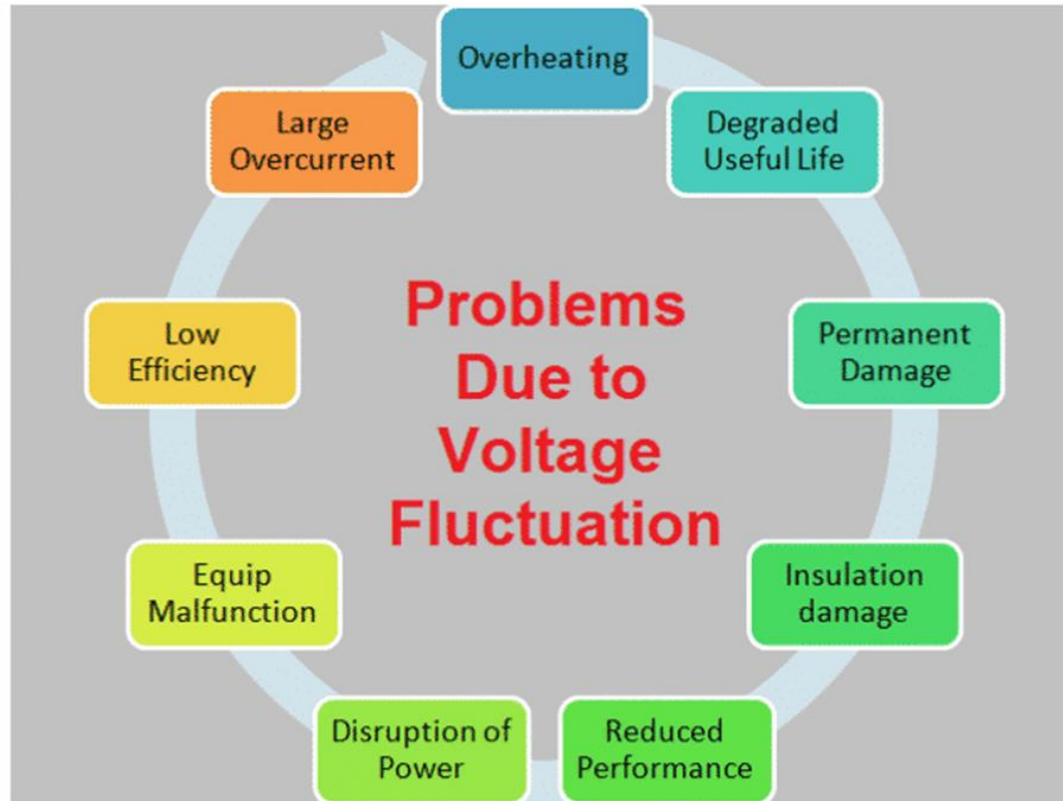


Fig. 2 – Problems Due to Voltage Fluctuations

Remember, nothing is more important for an electrical/ electronic device than a filtered, protected and stable power supply feed. A correct and stabilized voltage supply is very much required for the device to perform its intended function in the most optimized way. It is the Voltage stabilizer which ensures that the device get the desired and stabilized voltage no matter how much the fluctuation is. Therefore, Voltage stabilizer is a very efficient solution for anyone who desire to get an optimum performance and protect their devices against these unpredictable voltage fluctuations, surge and noise present in the supply.

Different Types of Voltage Stabilizers:

Relay Type Voltage Stabilizers



A Relay Type Voltage Stabilizers has a transformer with tapping, relay, and an electronic circuit board. The electronic circuit board carries out the comparison of the output voltage with the reference voltage source. As soon as it detect any rise or fall in the input supply beyond the reference value, it switches the related relay to connect the required tapping for buck/boost function.

A Relay Type Voltage Stabilizers normally stabilize the input fluctuation of 15% with the output voltage accuracy between 5-15%.

Different Types of Voltage Stabilizers:

Servo based Voltage Stabilizers

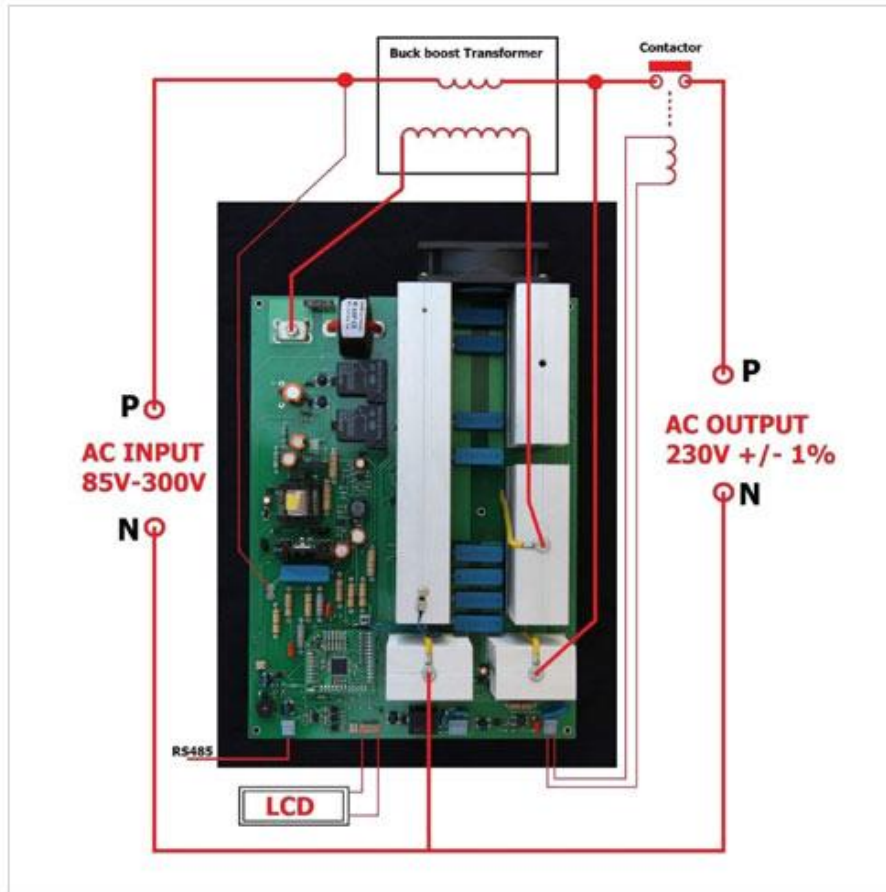


A Servo based Voltage Stabilizers has a servo motor, auto transformer, buck and boost (tapped) transformer, a motor, other supporting components, and an electronic circuit board As soon as it detect any rise or fall in the input supply beyond the reference value, it starts operating the motor which further moves the arm on the auto-transformer.

As the arm on the auto-transformer moves, the input voltage to the primary coil of 'Buck & Boost' transformer will change to the required Voltage Output. The servo motor will keep rotating till the difference between the Reference Voltage value and Stabilizer output becomes zero. This complete process happens in milliseconds.

Different Types of Voltage Stabilizers:

Static Voltage Stabilizers




A Static Voltage Rectifier has no moving parts as in case of Servo based Voltage Stabilizers. It uses a Power Electronic Converter Circuit to stabilize the voltage. These Static Voltage Stabilizers have very high accuracy and the voltage stabilization is within $\pm 1\%$.

A Static Voltage Stabilizer contains 'Buck & Boost' transformer, Insulated Gate Bipolar Transistor (IGBT) power converter, Microcontroller, Microprocessor and other essential components.

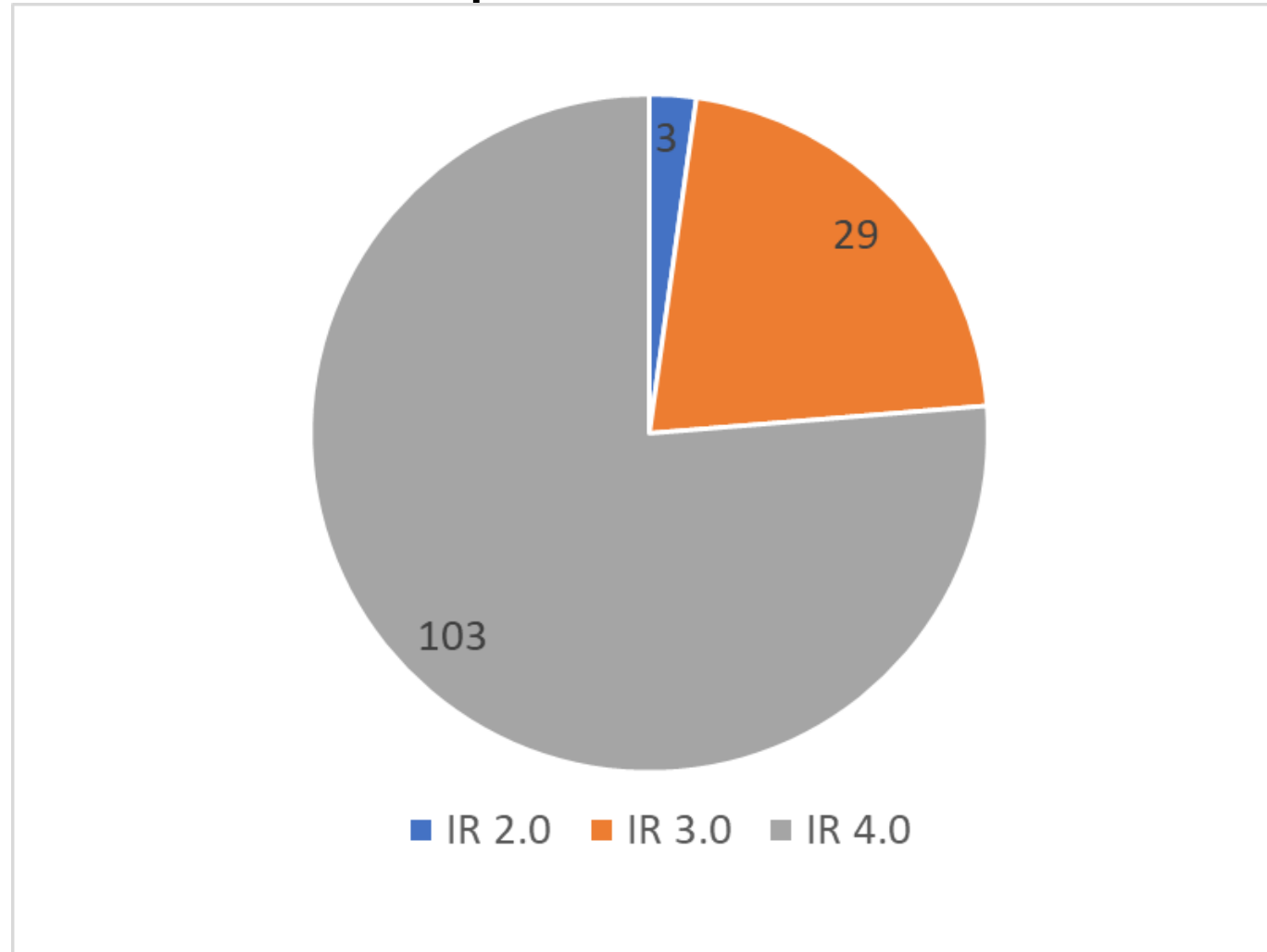
Microcontroller/ Microprocessor controls IGBT power converter to generate the required voltage level using 'Pulse Width Modulation' technique.

A stylized illustration of a person sitting at a desk, viewed from behind. Their arms are raised in a 'V' shape, holding two glowing lightbulbs. The desk has a laptop, a pen, and some papers. To the right is a small bookshelf with several books. The background is a light blue gradient.

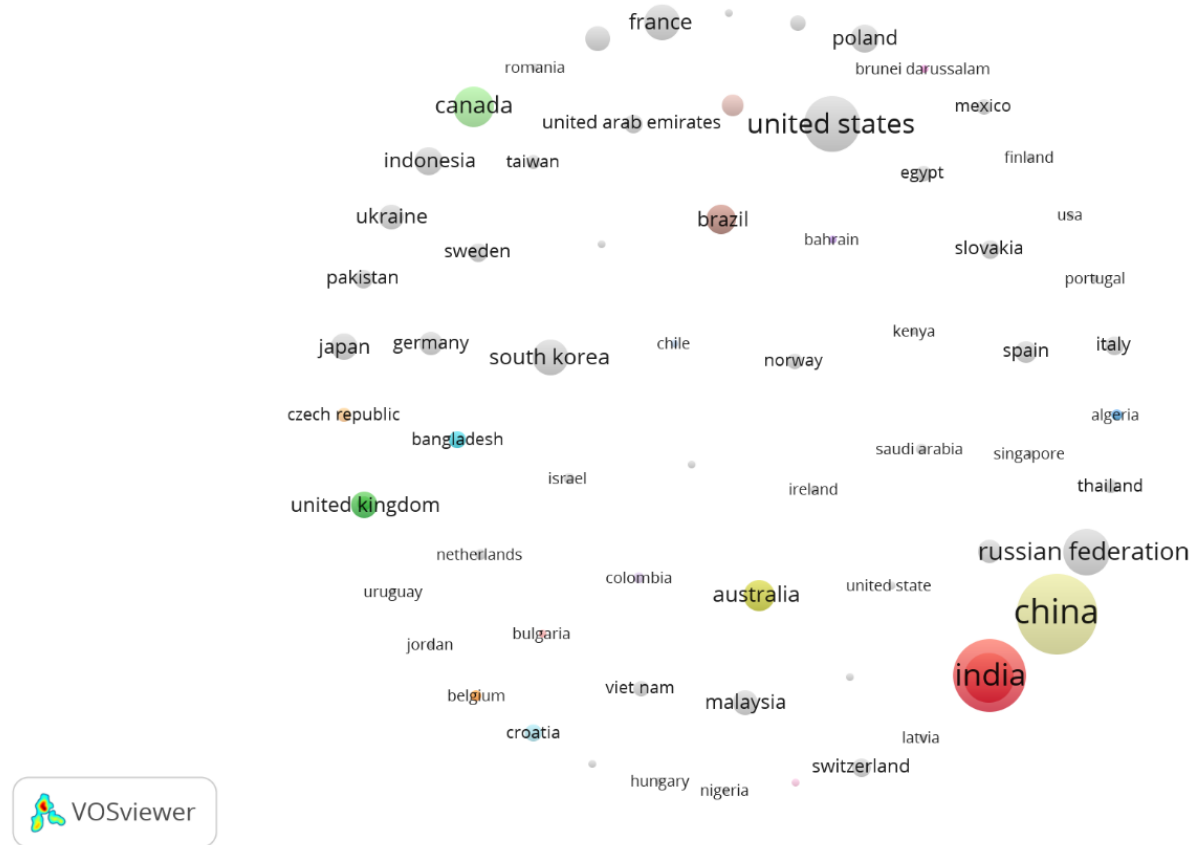
Where should I start: how to
stop being a newbie and focus
on the improvement

@OksanalvanovaPM 

The number of voltage stabilizer researches per year in each period

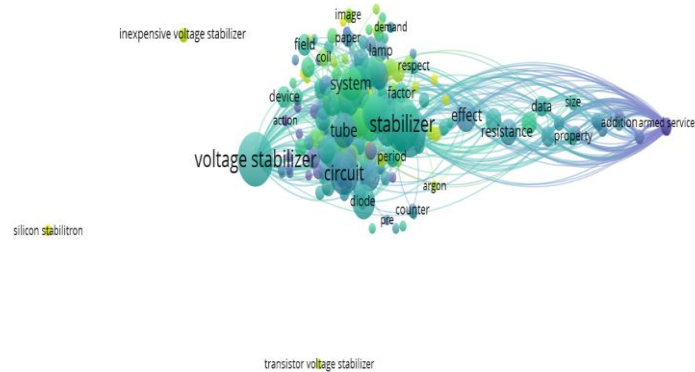


country citation network visualization

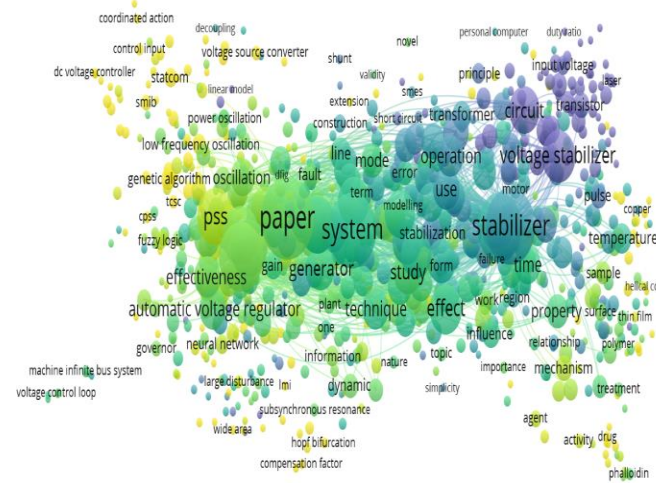


Overlay visualization of voltage stabilizer research

IR 2.0

 VOSviewer VOSviewer

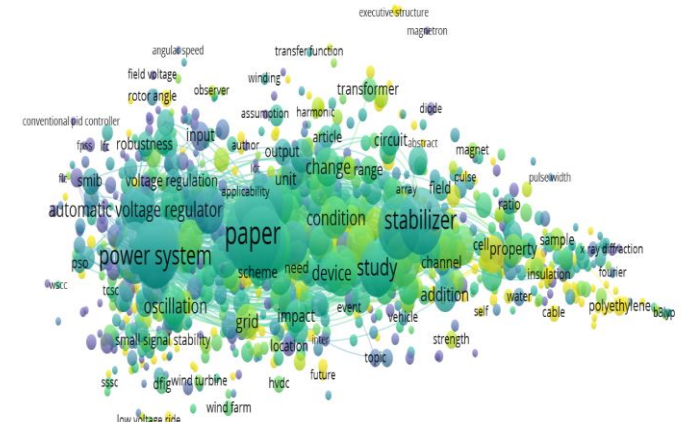
IR 3.0



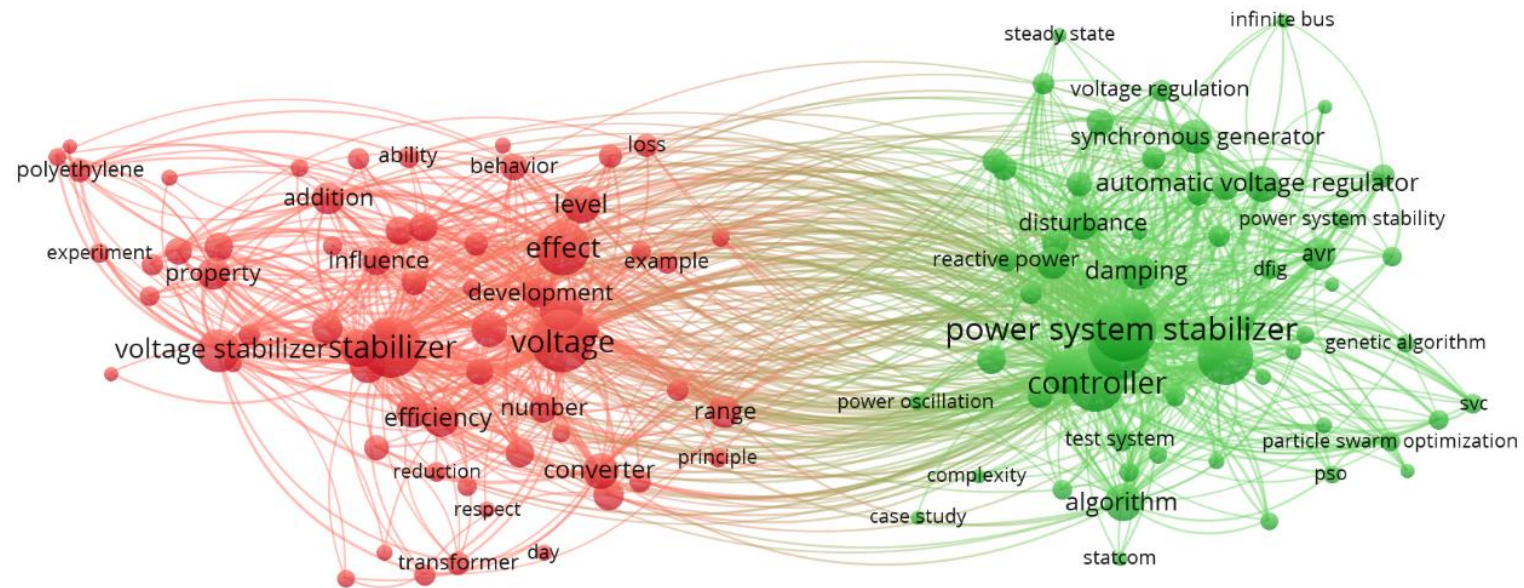
A horizontal timeline bar with a color gradient from dark blue on the left to yellow on the right. It is marked with the years 1990, 1995, 2000, and 2005.

 VOSviewer

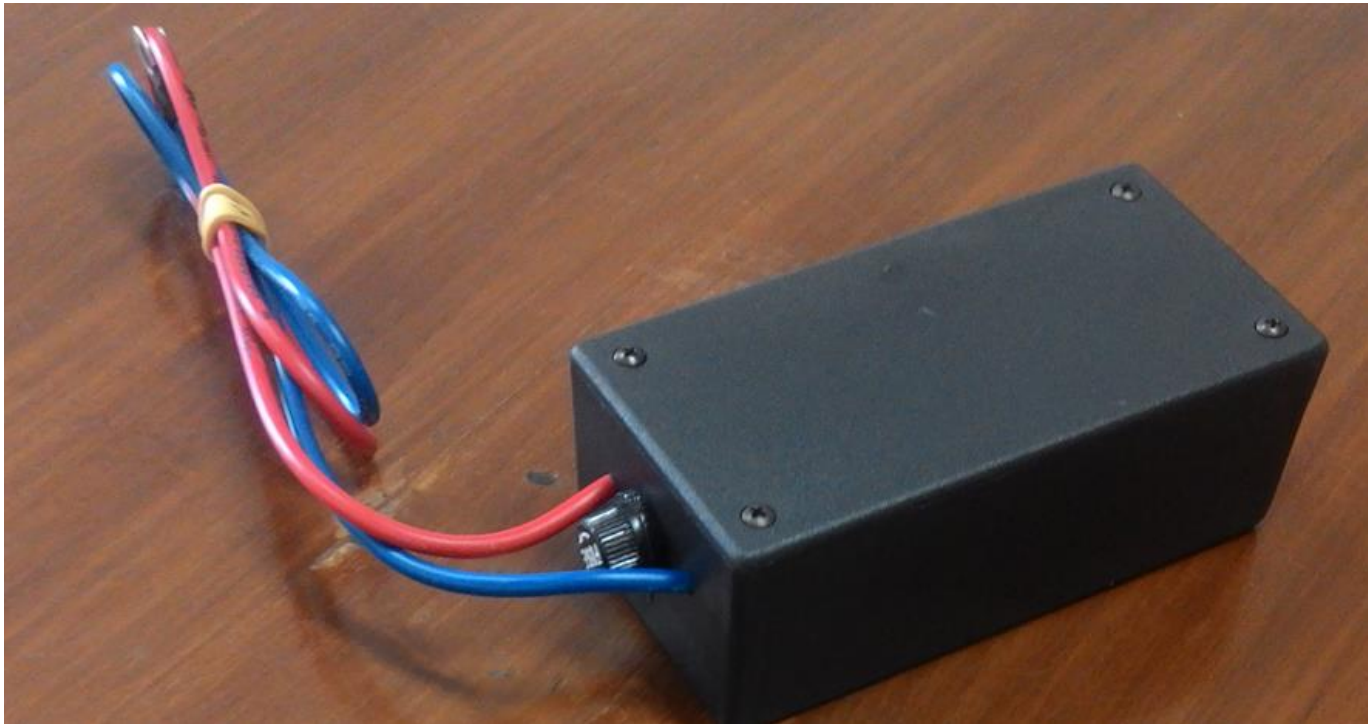
IR 4.0



title & abstract network visualization



Our Research on Voltage Stabilizer

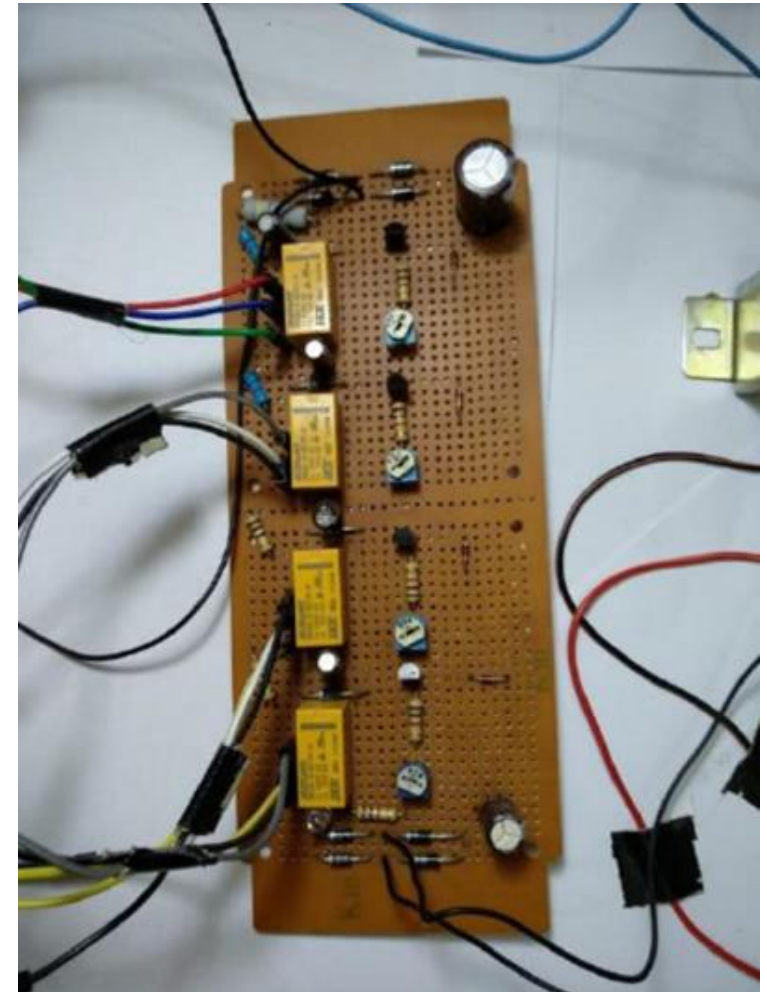
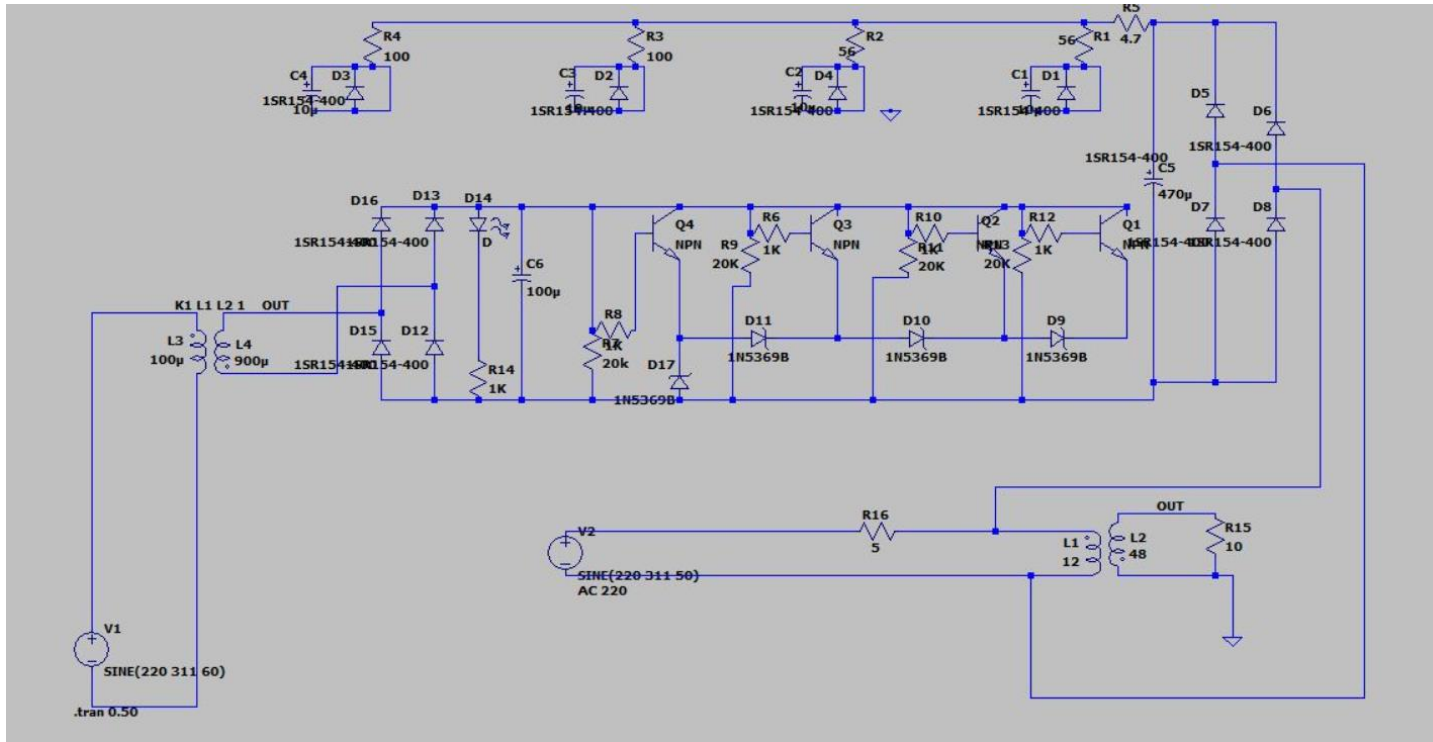


Research on voltage stabilizers has been carried out since 2013 with an emphasis on electronic designs and circuits. This voltage stabilizer was originally designed for the car's electrical system and it was connected to the accumulator.

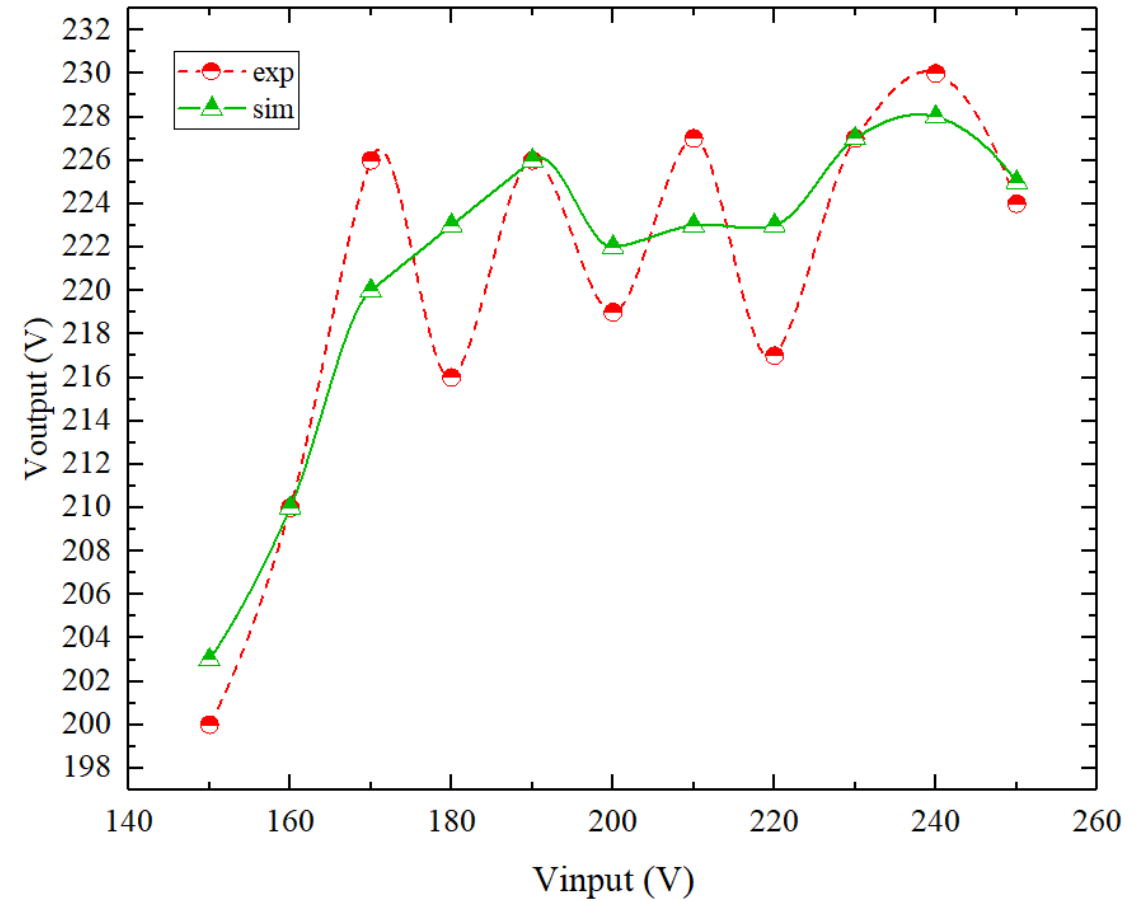
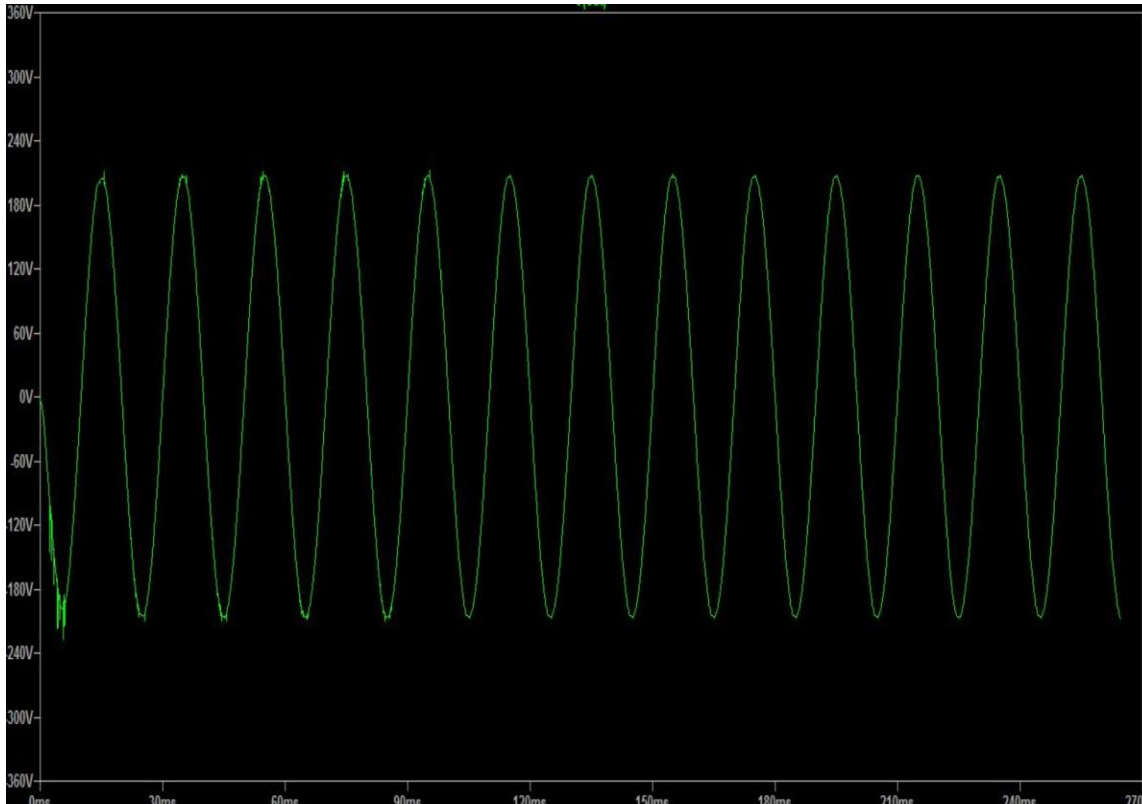
The stages of research on voltage stabilizer



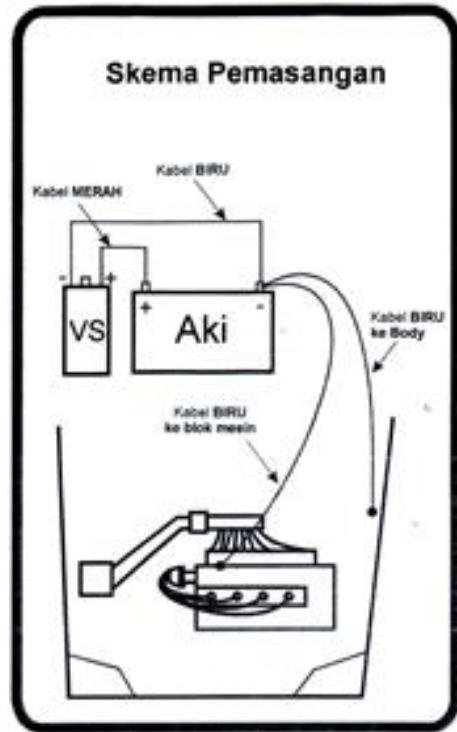
Voltage stabilizer circuit



Simulation and experimental result



Testing of Voltage Stabilizer in a car



Effect of Application of Voltage Stabilizer on a car



brighter turn signal, louder horn sound, clearer audio, cooler AC, and smoother engine sound and vibration.

5 simple tips to help you survive the 4th industrial revolution

Do you want to choose a career that minimises your risk of being replaced by a robot? Here are five things to think about:

- Study data science and/or get a job in data
- Choose a job that robots still can't do well – focus on jobs that require skills like creativity, problem solving and connecting with people on a human level
- Keep in touch with the job market to get an insight of which jobs are in demand and its average salary
- Be data savvy – learn how to use data to make decisions and solve problems
- Get familiar with artificial intelligence

Thank you...



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