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Hybrid Energy Storage System for Electric Vehicle using Neural Network PI Controller

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ABSTRACT: In this paper, concept strategies for a Hybrid Energy Storage System for Electric Vehicles High electricity demand are pushing for more strict controls, frequent regulations, and new challenges in developing and perfecting certain strategies. The various kinds of energy-efficiency endeavors include actions in construction, shipping, trade, and some other operation. Laptop sided connectivity in entertainment, to computers and smartphones, including portable pcs. necessary distinction to be made the potential to use renewable resources for storing energy is the technology for reducing demand is the facility to store any unused energy expose large amounts of usable resources for extended periods of time and effectively store it. As a result, this is a matter of extensive research and study. A more focused understanding view of the perspectives of electric cars would include their importance for hybrid energy storage systems. A new approach using neural network and PI is implemented in this paper for better distortion less outputs.

KEYWORDS: Electric vehicle, hybrid, energy, storage

I. INTRODUCTION

Until only a few years ago, longevity sources could only be provided by oil. With the help of oil, modern life sources proliferate. [1] The quality of currently involved in the field [applied to] improvement of lithium-ion vehicles is encouraging the introduction of expansive PHEV (plastics for electrical vehicles) PHEV (flow batteries with increased thickness) which provides more diversification of PHEV (flow-age battery) platforms whereas was to all appearances, the super capacitance, but not Capacitance X is greater than the regular Li-ion batteries, but the X quantity in relation to their output is around half will expand in the dynamic and transit modes and will need to implement a dynamic 0.5 time-separation system which includes solid-state batteries and capacitors for transportation electrically dynamic exercises to achieve and vehicles can use the super capacitor/transistor combination Although the direction of a growth for the headway for electric vehicles is moving through greater variety of types, use of a large stock of resources, and gathering flexibility, stockpiling of vital energies is essential, and scaling down the battery manufacturing is advantageous. [2-5]

The process of adding DC to DC devices to DC activities is simple and commonplace in a frameworks that are eager to expand the flow of headways is regardless of whether or not it is good for light-weight vehicles as they bear a striking management and high prize. [6] Thus, it's highly visible as a bi-bi-directional axis DC system and can be more susceptible to large power transmission change for a long period of time. A new zero-V power supply DC to DC transitional model, which offers continuing progressions in both directions. as well as this, the appliance is effective. Also in interleaved DC/intersilent DC devices display the likelihood of coupled inductors, however, they are the most practical kind of devices for power transmission. It is required for each 0.5 and 0.5 banking procedure to pick a relevant vitality The study concluded that the most relevant assets were those considered at 0.5 and 0.5 LIV. [7] information process reports stay in the course by reference. Reportable structures may be detected in stages by rule set use, neural networks, with cuts after any instance of VPA, and the technique of dynamic programming (DP) or repetition and dynamic growth (Expand Decuple) are registered and structured in paper-like categories. [8] The key goals of the use of good management systems are to empower efforts for low offers, to identify the essentialities of worth and remove limiting factors, and constraints. Libraries or structures like this are commonly designed to be evaluated and separated into extended and on a whole programme basis. In order to maximise overall expansion, it is essential to distribute the

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available power as equally as possible across multiple areas. [9] To increase on-online accuracy, needs to be done when clear, simple, consistently applied specifications are utilised. [10]

A similar, as well as individual, model and type of DC-DC generator are being used in place of basic, 0.5 and type electrical vehicles Like the topology and supercapacitor, the DC-DC systems provide addressing, dealing modes that apply similarly to all Li-part battery types. according to the official guidelines, the paper intends to implement a Li-part battery control complex constrain package that will mostly focus on the charge status of the super capacitor. so as to improve the lifespan and control parameters, the atom distributions have to be modified using Nelder-Mead At the end, the multiplication and exploration of results on merchandise amounts and values corroborate the concept of capacity-expanding warehousing.

II. PROPOSED WORK

A general understanding of how people's personalities are delineated through their neural processes is achieved by the use of general mechanisms. An approximate estimate puts the number of neurons in the human brain at 100 billion. Of neuron has an association that lies within one thousand and one hundred thousand ten-thousandths of an inch (0.1 mm or 0.01 m) of an affiliation stage. (According to this belief) Data is stored in individual minds in order to be used as reference materials, and is thus available to be retrieved by pulling out only one piece at a time, rather than by extracting it sequentially.

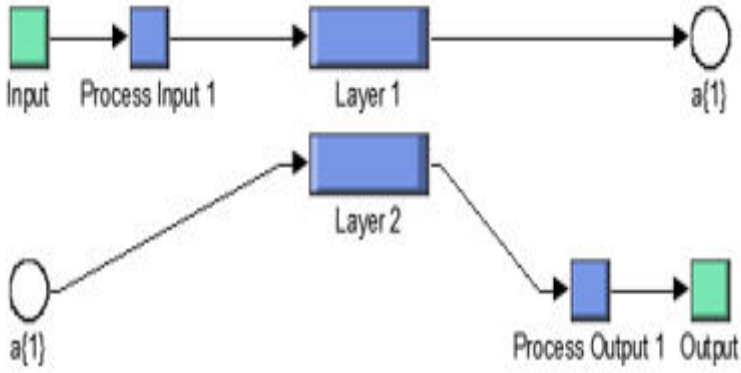

Fig. 1: Artificial Neural Network layer network

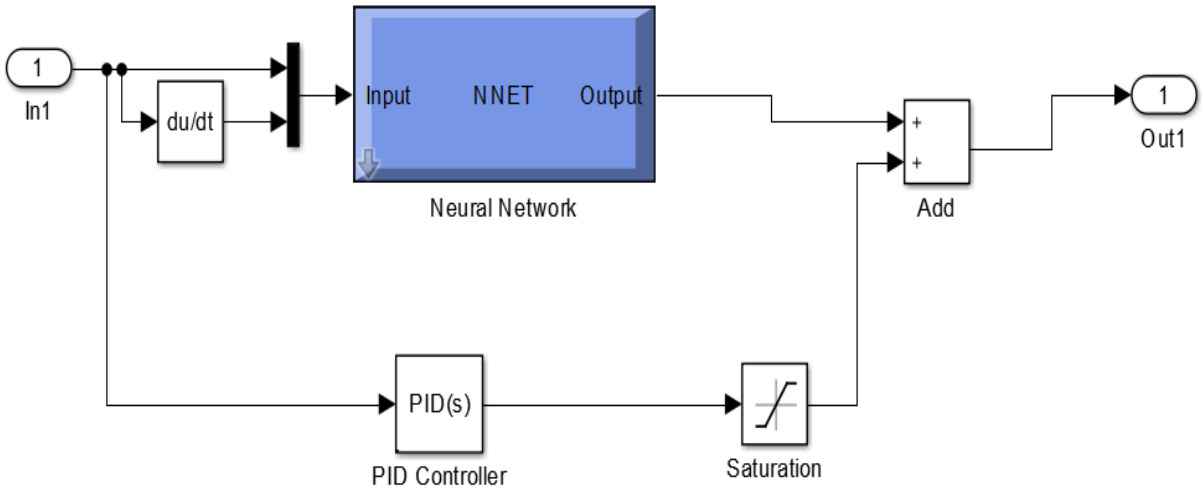

Fig. 2: NNPI Subsystem

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A virtual neural net is a data-processing worldview whose operation is analogous to that of organic sensory systems. A counterfeit neural system's critical feature is the novel configuration of its data handling architecture. This system is composed of a massive amount of intricately linked managing registering elements that function cooperatively to address explicit issues. False neural networks are being linked to an increasing array of genuine problems involving major unpredictability. They are resolving problems that are unreasonably complex for conventional advances or those that lack an algorithmic solution.

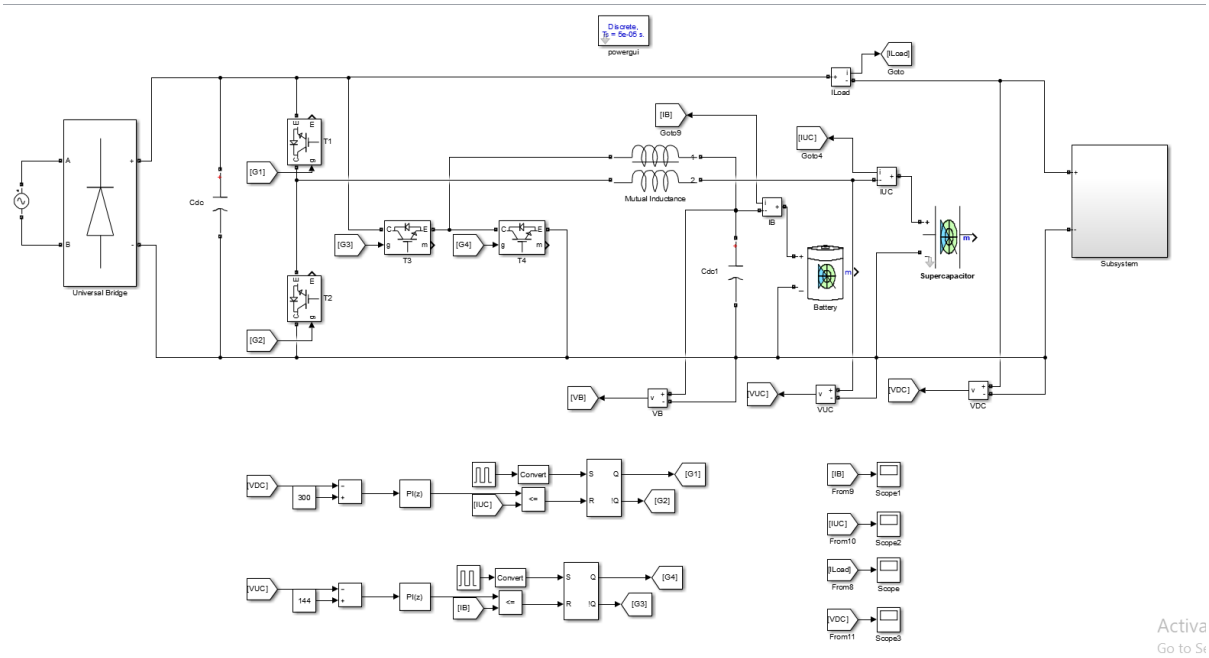

Fig. 3:HESS Energy Storage applied to electric vehicles in PI model

The above figure illustrates the HESS Energy Storage device implemented to electric vehicles in a PI model; it consists of a bridge rectifier super capacitor battery and subsystem, to which the proportional integral controller is added.

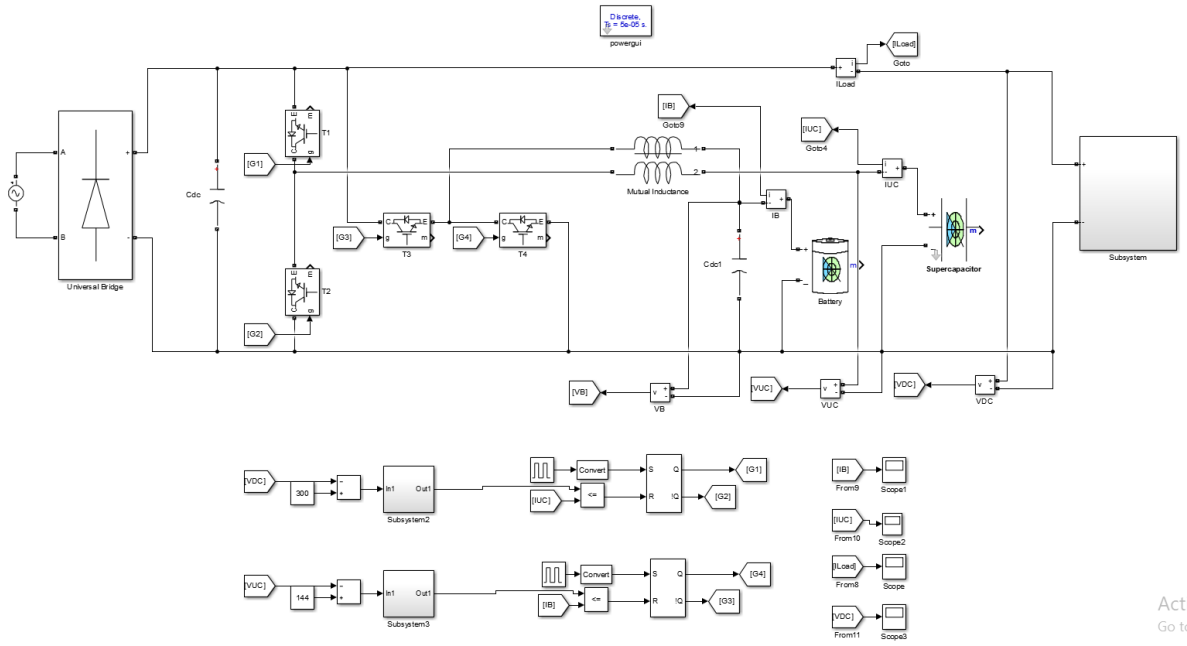

Fig. 4: Proposed HESS Energy Storage applied to electric vehicles in NNPI

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The above figure illustrates the proposed HESS Energy Storage system for electric vehicles in NNPI; in this case, we are combining an artificial neural network with PI; NNPI has a number of advantages over PI.

III. RESULTS

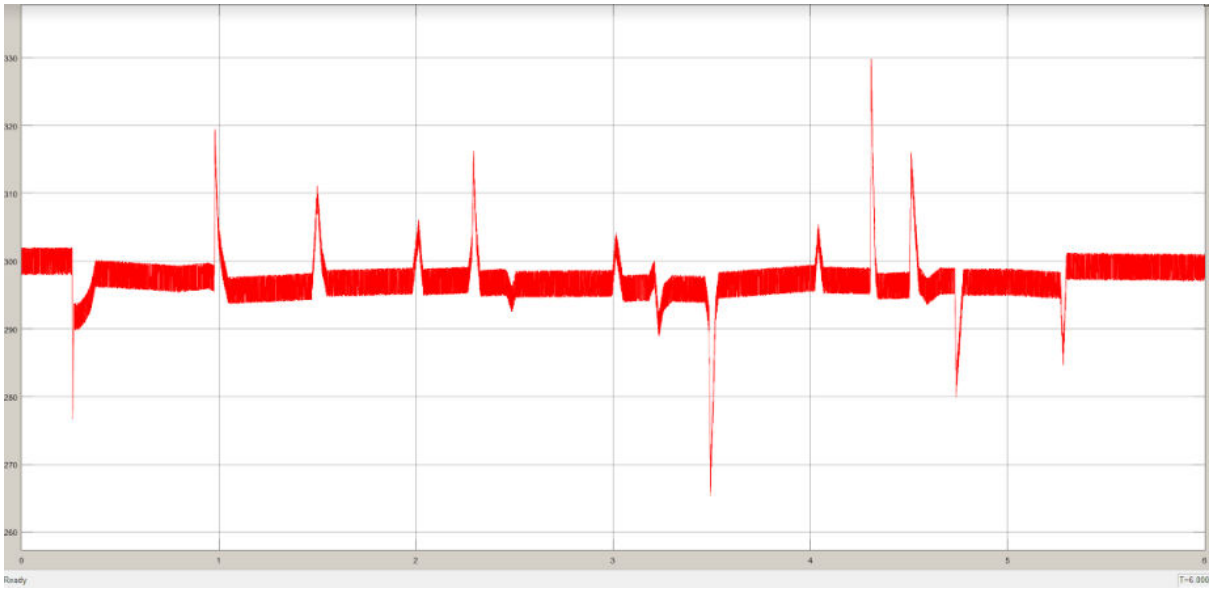

Fig. 5: Graph diagram of PI VDC

The above Fig. 5 shows the graph diagram of DC voltage in PI controller circuit.

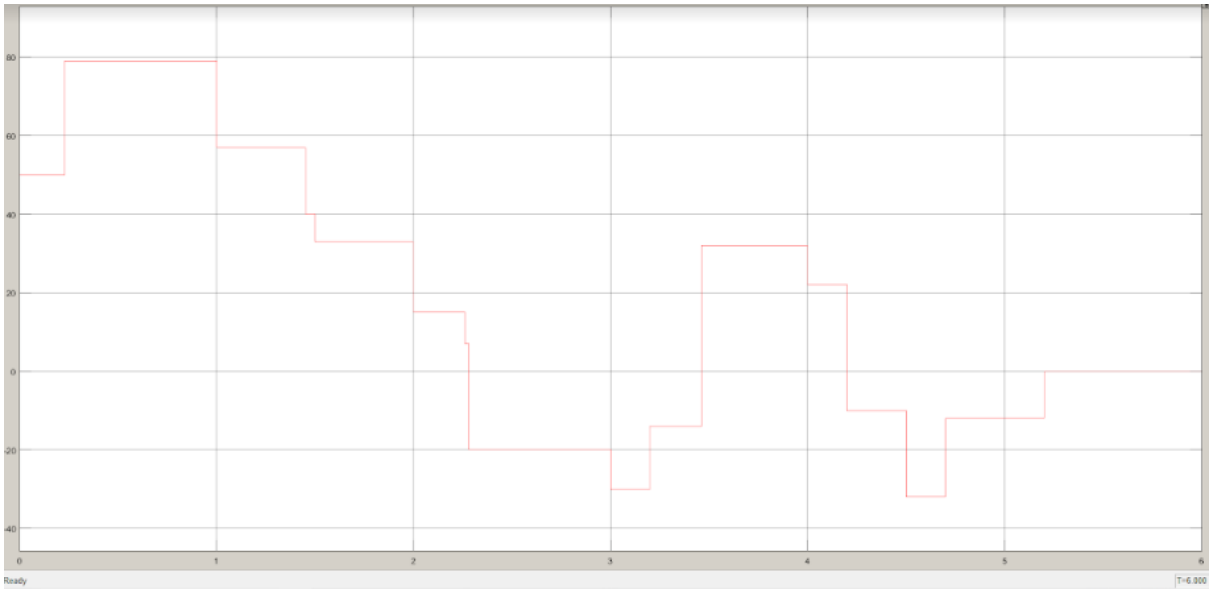

Fig. 6: Graph diagram of PI Loads

The above Fig. 6 shows the graph diagram of loads in PI controller.

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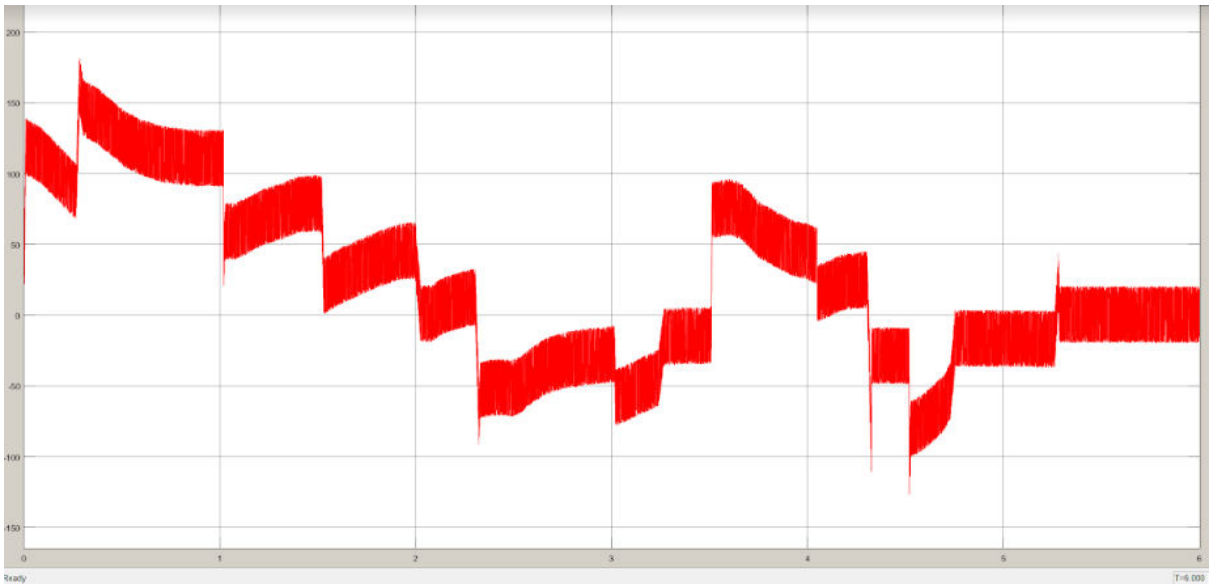

Fig. 7: Graph diagram of PI IUC

The above Fig. 7 shows the graph diagram of ultra-capacitor current (IUC) in PI controller.it have hundreds of times more electrical charge quantity than a normal capacitor current.

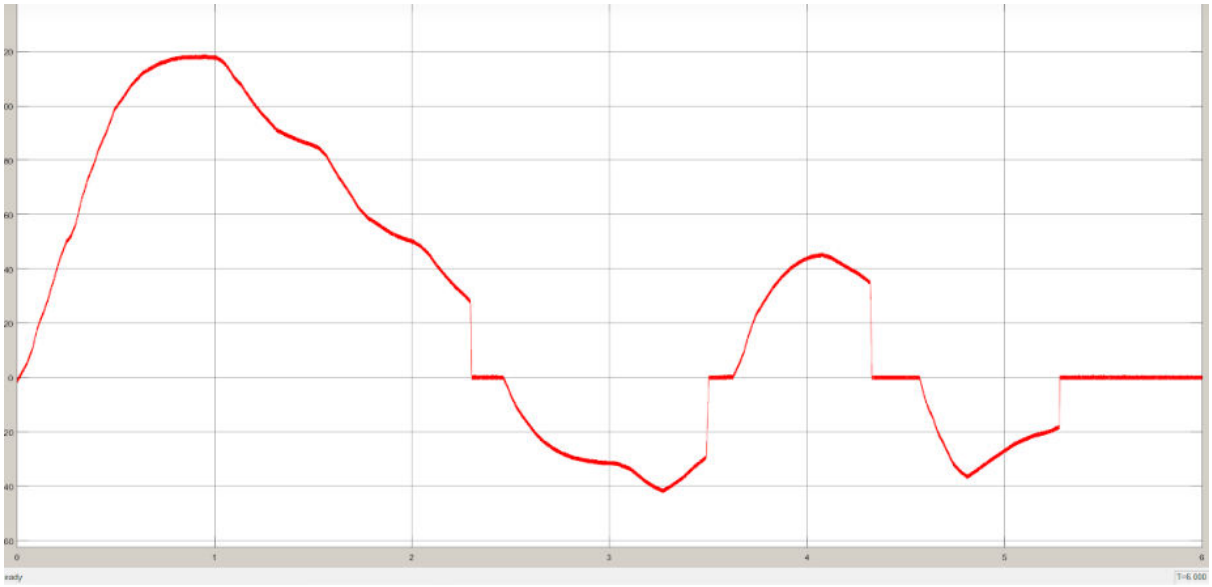

Fig. 8: Graph diagram of PI IB

The above Fig. 8 graph diagram shows the battery current (IB) in PI controller.

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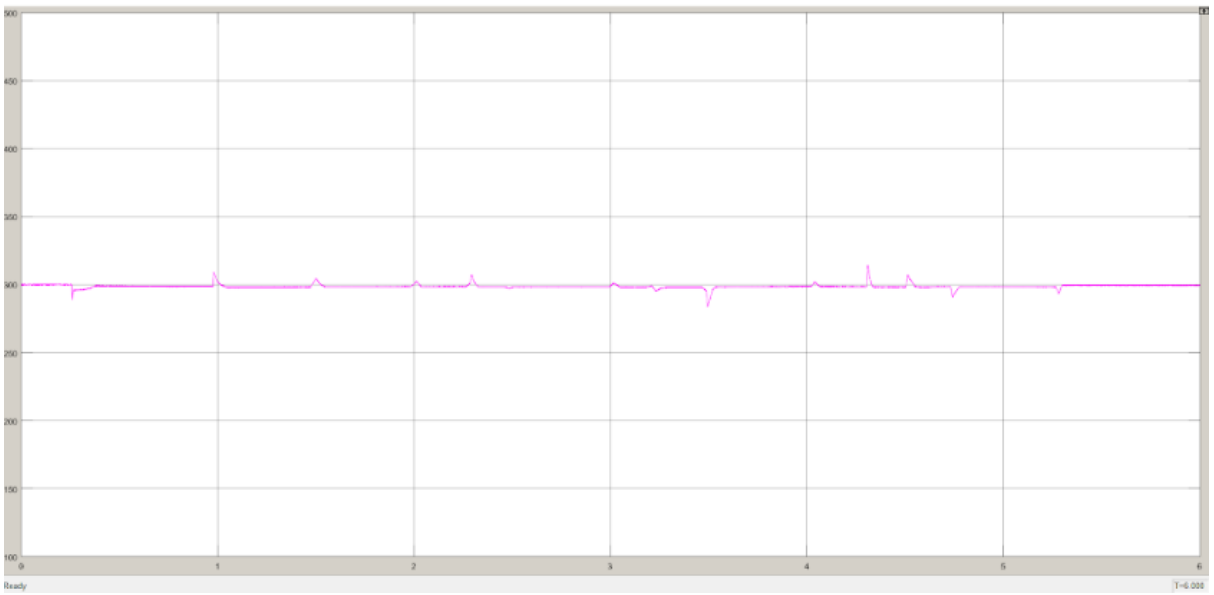

Fig. 9: Graph diagram of NNPI VDC

The above Fig. 9 shows the graph diagram of NNPI VDC. Here have the DC voltage in artificial Neural Network with PI-based circuit. Here we can see the distortion is less.

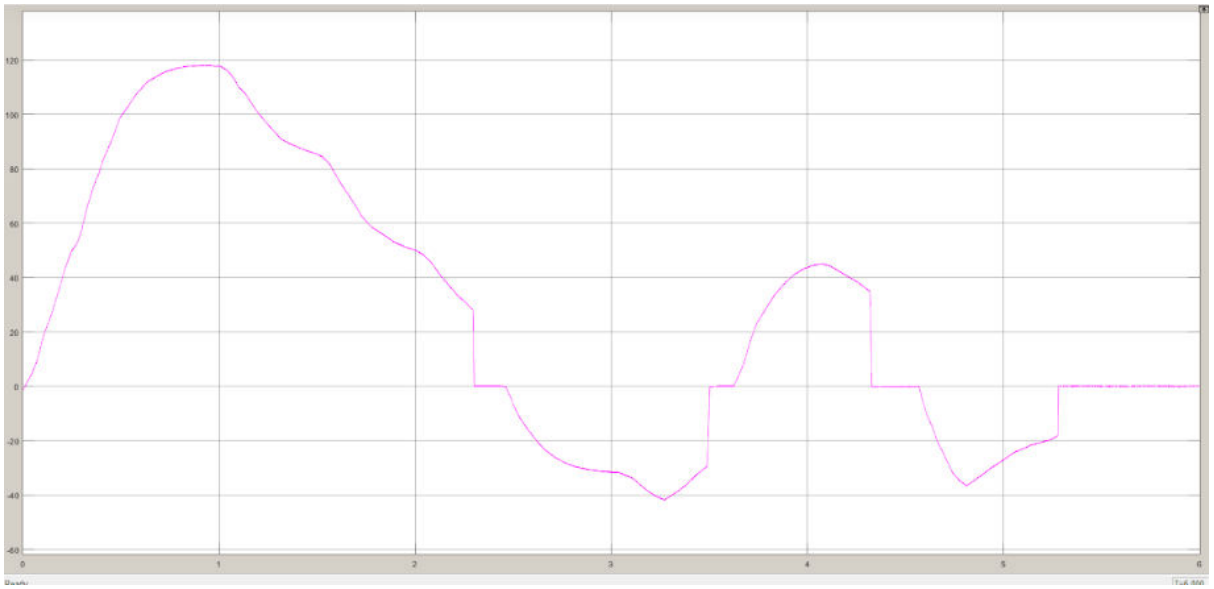

Fig. 10: Graph diagram of NNPI IB

The above Fig. 10 IS graph diagram of NNPI IB. here we can see the battery current in NNPI based circuits.

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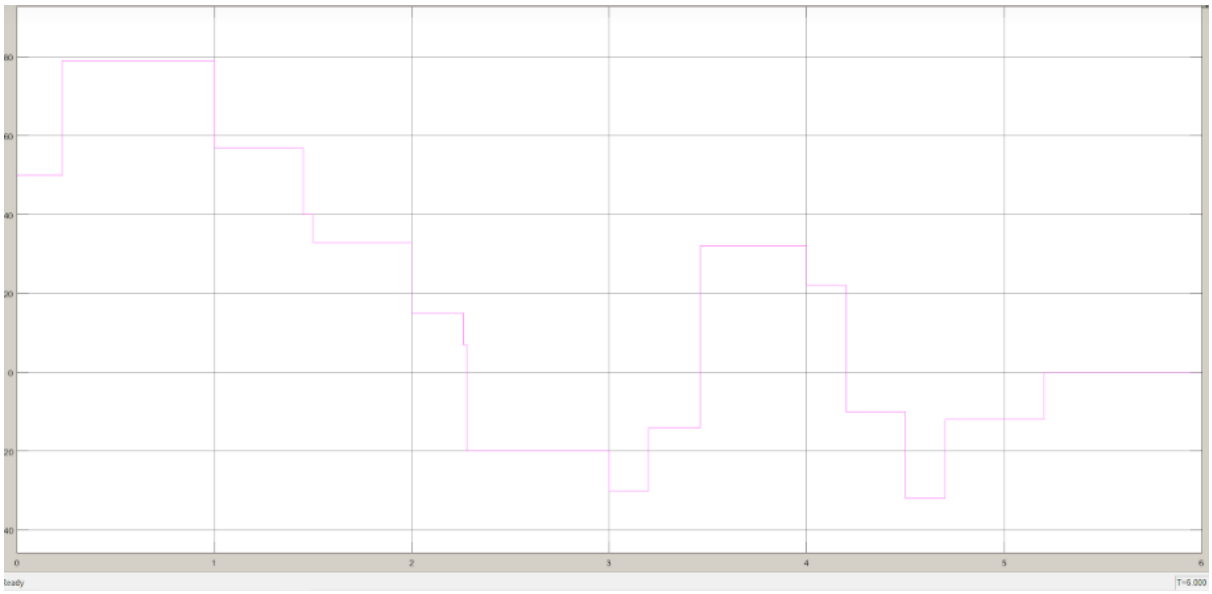

Fig. 11: Graph diagram of NNPI LOAD

The above Fig. 11 graph diagram of NNPI LOAD. Here graph shows the load current in NNPI based circuit.

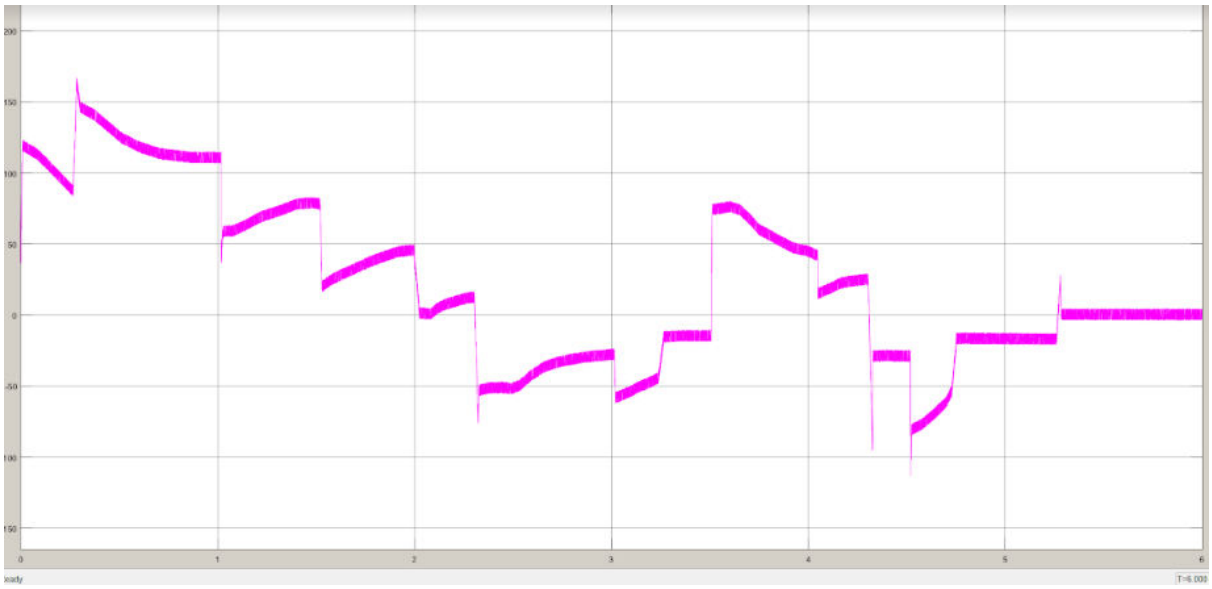

Fig. 12: Graph diagram of NNPI IUC

The above Fig. 12 is the graph diagram of NNPI IUC.in this graph diagram shows the ultra-capacitor current in NNPI based circuit.

IV. CONCLUSION

In this paper, the use of NNPI controller has improved the performance of hybrid energy storage system and distortions are reduced as seen in the results. Electric vehicles (EVs) are seen as a viable option to internal combustion engine vehicles because they emit less carbon dioxide. However, their exact benefits remain unknown, though energy quality may be increased in a variety of ways. Carbon pollution benefits from electric vehicles are significantly reduced if they are charged with electricity generated by petroleum power plants due to power loss during production, transmission, transfer, and charging. In the other side, regenerative braking is the direct transfer of energy from the wheel to the battery which is one of the most critical mechanisms for increasing the energy consumption of an electric vehicle.

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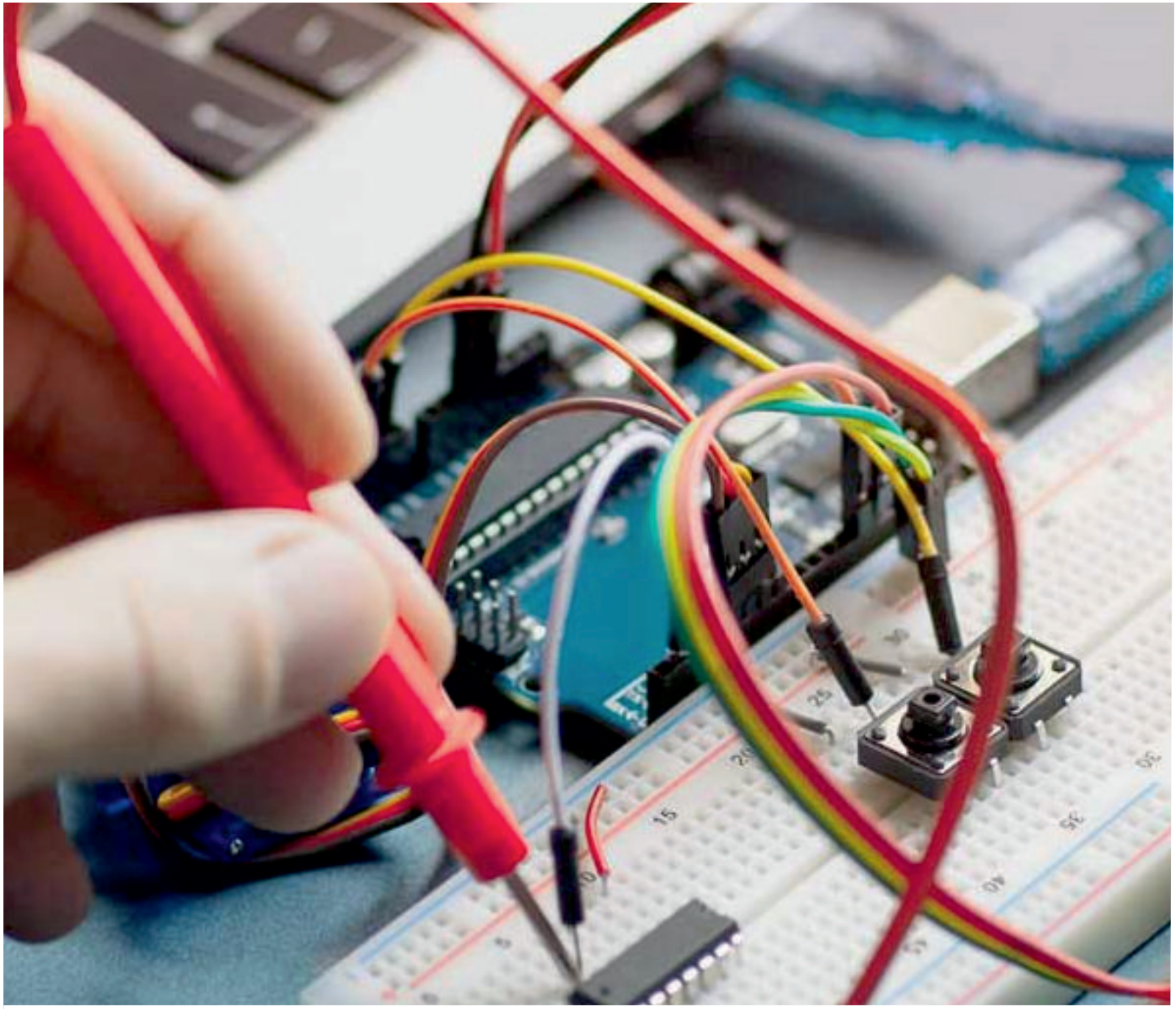
Power loss during regenerative braking can be minimized by using a hybrid energy storage device (HESS) in which super capacitors accept large amounts of power in lieu of batteries' low rate capacity.

REFERENCES

[1] Linda Barelli ID et al., "Dynamic Analysis of a Hybrid Energy Storage System (H-ESS) Coupled to a Photovoltaic (PV) Plant" 10 January 2018; Accepted: 2 February 2018; Published: 8 February 2018
[2] Mohamed, Naoui & Flah, Aymen & Mouna, Ben. (2019). Wireless Charging System for a Mobile Hybrid Electric Vehicle. 10.1109/ISAECT.2018.8618829.
[3] Terzi, Ümit & Ilhan, Huseyin & Kaymaz, Habib & Erdal, Hasan & Çalik, Hüseyin. (2020). A Review of Commercial Electric Vehicle Charging Methods. PROMET - Traffic&Transportation. 32. 291-307. 10.7307/ptt.v32i2.3252.
[4] Al-Otaibi, Mutlaq. (2020). Self-Charging System for Electric Vehicles. Innovative Systems Design and Engineering. 10.7176/ISDE/11-5-04.
[5] Younghyun Kim,et al., "Computer-Aided Design and Optimization of Hybrid Energy Storage Systems" Electronic Design Automation Vol. 7, No. 4 (2013) 247–338 c 2013
[3] Ian C. Smith et al., "Benefits of Battery-U Ultracapacitor Hybrid Energy Storage Systems" May 17, 2012,
[6] Karl BA.et al., "Design and Evaluation of Hybrid Energy Storage Systems for Electric Powertrains" Waterloo, Ontario, Canada, 2010 © Karl BA. Mikkelsen 2010
[7] S. Piriienkoet al., "Optimization of Hybrid Energy Storage System for Electric Vehicles" Manuscript received: September 15, 2016; accepted: November 24, 2016.
[8] Tobias Anderssona , et al., "Alternative Energy Storage System for Hybrid Electric Vehicles" IEEE AES magazine, p14- 19, 1992
[9] M. Gopikrishnan et al, "Battery/ultra-Capacitor Hybrid Energy Storage System for Electric, Hybrid and Plug-in Hybrid Electric Vehicles" Middle-East Journal of Scientific Research 20 (9): 1122-1126, 2014
[10] Xiaodong Zhang, et al., "A Multi-hybrid Energy System for Hybrid Electric Vehicles" World Electric Vehicle Journal Vol. 4 - ISSN 2032-6653 - © 2010 WEVA



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