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# Secondary Reading Information Security: Preparation for Higher Education

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**ABSTRACT:** As a community-based treatment form, probation is a new and undevelopment, but, a rapidly developing field of social work in Turkey. This article seeks to provide a brief assessment of this new field in addition to investigating whether social workers function as change agents and also include information related to this role while writing their probation reports. Payne's (1997) systems model formed the conceptual framework while analyzing content of probation reports. Probation reports obtained from four different juvenile courts in Turkey and, for the current study, researchers analyzed 926 probation reports of 219 children. Major research findings showed that as change agents, probation officers mainly excercise enabling role followed by facilitating and teaching roles. Mediating and educating roles, which are essential roles while working and including the environment in the probation process, are also practiced rarely. It was also interesting that organizing role was never undertaken by probation officers. Being the first study to examine probation process in Turkey constitutes the significance of this present article. Another significance of this study is that it reflects the process of probation in a different cultural context. It is hoped that this study will encourage the building of bridges between researchers and those take role actively in the field of juvenile justice system.

**KEYWORDS-** cartoon animation, probation report, systems model.

## INTRODUCTION

Although a number of IS security approaches have been developed over the years that reactively minimize security threats such as checklists, risk analysis and evaluation methods, there is a need to establish mechanisms to proactively manage IS security. That said, academics' and practitioners' interest has turned on social and organizational factors that may have an influence on IS security development and management. For example, Reference [29] have emphasized the importance of understanding the assumptions and values of different stakeholders to successful IS implementation. Such values have also been considered important in organizational change [34], in security planning [39] and in identifying the values of internet commerce to customers [14]. Reference [7] have also used the value-focused thinking approach to identify fundamental and mean objectives, as opposed to goals, that would be a basis for developing IS security measures. These valuefocused objectives were more of the organizational and contextual type.

The role of energy storage devices in modern technology is increasing as renewable and sustainable energy sources is widely used. Such devices are considered as one of the key technologies for emerging markets as the use of more renewable energy sources, in order to minimize fossil fuel consumption and appropriate integration of clean energy sources in the grid and off-grid applications. Undesirably the coating nature of most renewable energy facilities, such as solar and wind, makes them unsuitable for standalone operation since they are strongly affected by weather conditions, causing energy variations and stability problems in the power network. Several measures can be adopted to deal with this problem, but are dependent on the existence of some type of energy storage devices.

A number of studies investigated inter-organizational trust in a technical context. Some of them have studied the impacts of trust in an e-commerce context [9,10,25] and others in virtual teams [31,32]. Reference [42] studied trust as a factor in social engineering threat success and found that people who were trusting were more likely to fall victims to social engineering than those who were distrusting. Reference [16] used a goal setting approach to identify weaknesses in security management procedures in terms of the trust employees put on other group members to communicate security goals efficiently. Reference [35, p. 1551] also reviewed 1043 papers of the IS security literature for the period 1990-2004 and found that almost 1000 of the papers were categorized as 'subjective-argumentative' in terms of methodology with field experiments, surveys, case studies and action research accounting for less than 10% of all the papers.

Owing to the concerns about the environmental impact of transport, battery electric vehicles (BEVs) have received a tremendous interest to reduce the greenhouse emissions. The commercialization of BEVs has been possible due to advances in power electronics converters, battery technologies, battery charging systems, electric motors and power management control [6]. However, the BEV still faces major challenges that need to be solved. These major challenges are battery cost, battery lifetime, long charging time and limited range. In advance automotive applications, because the load profile varies rapidly according to the road conditions and the drivers behaviour, the energy storage system suffers from random charges and discharges, which have a negative effect on the life of the battery [8]. A common ground switched-quasi-Z-source bidirectional DC-DC converter [1] is a non-isolated topology which is based on the traditional two-level quasi-Z-source bidirectional DC-DC converter, changing the position of the main power switch. It has the advantage of high voltage-gain, lower voltage stress across the power switches, and an absolute common ground.

To solve the problems listed above, hybrid energy storage systems (HESS) have been proposed by many researchers. The basic idea of a HESS is to combine ultra-capacitors and batteries to achieve a better overall performance. This is because, compared to batteries, ultra-capacitors have a high power density but low energy density. Hybrid energy storage system of electric vehicles has great potential to take full advantages of high power density with super-capacitor and high energy density with battery to improve the dynamic performance and energy efficiency of electric vehicles. In this project, a Super/ Ultra Capacitor is integrated with the battery in an Electric Vehicle using a New Bidirectional DC-DC Converter to improve the dynamic performance of the vehicle system and enhancing the battery life.

The rest of the paper is organized as follows. Proposed battery super-capacitor hybrid system is explained in section II. Simulation and results is explained in section III. Experimental setup and results are presented in section IV. Concluding remarks are given in section V.

## PROPOSED BATTERY-UC HYBRID SYSTEM FOR ELECTRIC VEHICLES

The proposed battery super capacitor hybrid system is shown in Fig. 1. There are two input sources, two bidirectional DC-DC converters, a dc bus and finally the PMDC motor. The project is focused on the Z-source bidirectional DC-DC converter [1]. The main objectives of using ultra-capacitors alongside batteries are: improving performance (i.e., acceleration), increase the system efficiency (through the use of regenerative braking) and extend the battery life. The system uses a 24V battery and a 2.7V super-capacitor. The DC bus is rated to a voltage value of 24V. The batteries have a high energy density, but limited power density, are capable of supplying the main power to drive the motor. The super-capacitors have a low energy density and high power density. Therefore, by combining these two devices a high efficient, high performance vehicle can be obtained. The bidirectional z-source DC-DC converter is used to interface super-capacitor with DC bus. This converter is characterized by a simple control technique. In addition, t$_{min}$he use of z-source bidirectional converter facilitates high voltage gain eliminating the need of costly super-capacitor.

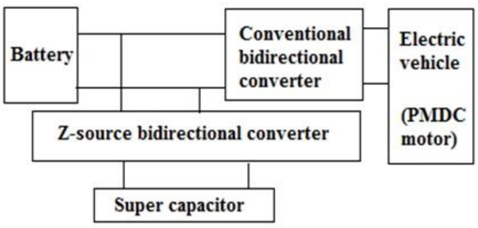



Fig. 1. Block diagram of proposed system

### *A.* Z-Source bidirectional converter

Bidirectional z-source DC-DC converter is based on the traditional two-level quasi-z source bidirectional converter by simply changing the position of the main power switch [1]. As a result, the proposed converter can select the power switches with the low rated voltage, and the low on-state resistance, which in turn can improve the conversion efficiency. It consists of a switched-quasi-z-source network, 3 power switches and high or low voltage side filter capacitors are shown in Fig. 2. The converter can operate either in the step-up or in the step-down mode, enabling the bidirectional power flow between the high-voltage and low-voltage side. There are two operating modes. ie, step-up operating modes and step-down operating modes.

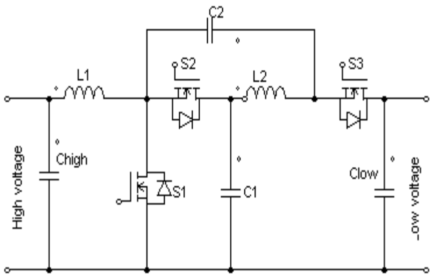



Fig. 2. Z-source bidirectional converter

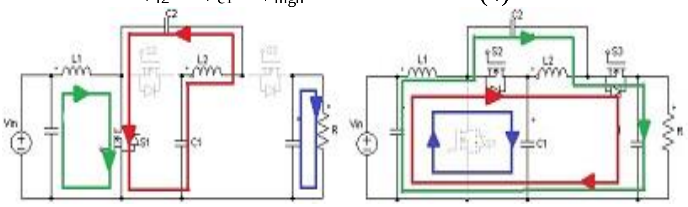
In step-up operating mode, $S_1$ operates as a main power switch and $S_2$ and $S_3$ are the synchronous rectifiers.

Mode 1: $S_1$ is turned on, and $S_2$ and $S_3$ are turned off, the current flow paths are shown in Fig. 3(a). The inductor $L_1$ charged through $S_1$, while the capacitor $C_1$ is discharged, and the energy is transferred to the capacitor $C_2$ and $L_2$.

$$V_{l1} = V_{low} \quad (1)$$
$$V_{l2} = V_{c1} - V_{c2} \quad (2)$$

Mode 2: $S_1$ is turned off, and $S_2$ and $S_3$ are reversely turned on, the current flow paths are shown in Fig. 3(b). During this interval, the input voltage $V_{in}$ and the inductor $L_1$ charge the capacitor $C_1$ in series. The capacitor $C_2$ is connected in parallel with inductor $L_2$, then connected with $V_{in}$ and $L_1$ in series to charge the capacitor $C_{high}$ and provide the energy for the load.

$$V_{l1} = V_{low} - V_{c1} \quad (3)$$
$$V_{l2} = V_{c1} - V_{high} \quad (4)$$



(a) (b)

Fig. 3. Step-up mode (a)Mode-1 (b)Mode-2

the relationship between the voltage gain and the duty ratio can be obtained as:

$$M_{boost} = 1 + D_{boost}\ 1 - D_{boost} \quad (5)$$

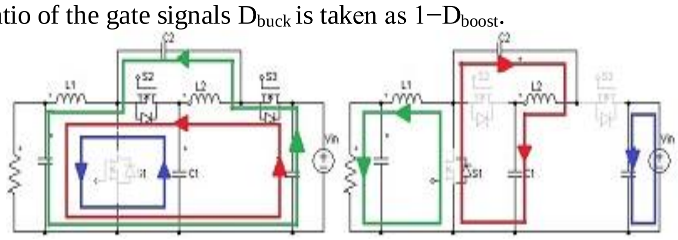
Inductance value can be given as:

$$L = V_{low} * D_{boost}\ F_S * \Delta i_L \quad (6)$$

Capacitance value is given as:

$$C_{min} = I_{high} * D\ F_S * \Delta v_c \quad (7)$$

In step-down operating mode, $S_2$ and $S_3$ operate as the main power switches, and $S_1$ is the synchronous rectifier. The duty ratio of the gate signals $D_{buck}$ is taken as $1 - D_{boost}$.



(a) (b)

Fig. 4. Step-down mode (a)Mode-1 (b)Mode-2

Mode 1: $S_1$ is turned off, and $S_2$ and $S_3$ are turned on, the current flow paths are shown in Fig. 4(a). $L_1$,$L_2$,$C_2$, and the low voltage side load are charged by $V_{in}$ through $S_2$ and $S_3$, while $C_1$ is discharged for $L_1$ and load through $S_2$.

$$V_{l2} = V_{high} - V_{c1} \quad (8)$$
$$V_{l1} = V_{c1} - V_{low} \quad (9)$$

Mode 2: $S_1$ is reversely turned on, S2 and S3 are turned off. The current flow paths are shown in Fig. 4(b). During this state, $C_2$ is connected in series with $L_2$ to charge $C_1$ through $S_1$. Inductor $L_1$ also supplies energy for the load through S1.

$$V_{l2} = -V_{low} \quad (10)$$

$$V_{l1} = V_{c2} - V_{c1} \quad (11)$$

*B.* Conventional bidircetional converter

The conventional bidirectional DC-DC converter forms an important part in the proposed battery-ultra capacitor hybrid system. In addition to performing the bidirectional buck boost operation, this converter also facilitates speed control of the PMDC motor by varying the armature voltage. Basic DC-DC converters such as buck and boost converters (and their derivatives) do not have bidirectional power flow capability. This limitation is due to the presence of diodes in their structure which prevents reverse current flow. In general, a unidirectional DC-DC converter can be turned into a bidirectional converter by replacing the diodes with a controllable switch in its structure. Fig. 5 shows the structure of elementary buck and boost converters and how they can be transformed into bidirectional converters by replacing the diodes in their structure.

Reference [13] discussed the importance of gaining improvements from software developers during the software developing phase in order to avoid security implications. Reference [36] advanced a new model that explains employees' adherence to IS policies and found that threat appraisal, self-efficacy and response efficacy have an important effect on intention to comply with information security policies. Culture is a perception of organizational norms and values and so it exists within the organizations, not in the individual. To this end, individuals with different backgrounds or at different levels in the organization may tend to describe the organization in similar way. Security culture is used to describe how members perceive security within the organization. Since security and risk minimization are embedded into the organizational culture, all employees, managers and end-users must be concerned of security issues in their planning, managing and operational activities. In order to ensure effective and proactive information security, all staff must be active participants rather than passive observers of information security. In doing so, staff must strongly held and widely share the norms and values of the organizational culture in terms of information security perception.

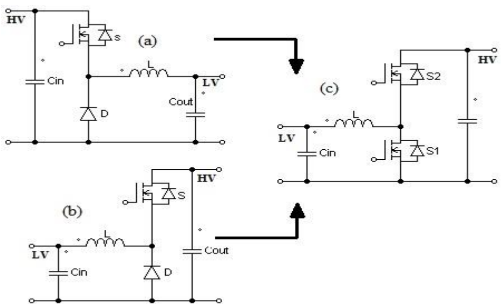



Fig. 5. Transformation to conventional bidirectional converter

SIMULATION AND RESULTS

The system model and the implemented control strategy has been simulated in the MATLAB/ Simulink as shown in Fig. 6. The main components in the system model are a new bidirectional quadratic DC-DC converter, a conventional bidirectional DC-DC converter, two sources (battery and UC) and finally the PMDC motor. Various parameters that are considered for the simulation has been given in Table 1 and Table 2.

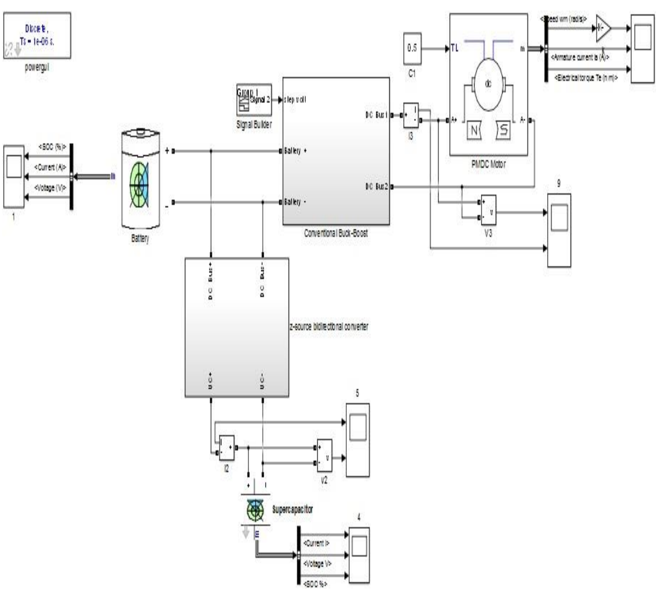


Fig. 6. Simulation of hybrid system fed PMDC motor

TABLE 1. SIMULATION PARAMETERS

| **Parameters** | **Specifications** |
| --- | --- |
| Input voltage,<br>V1(boost)<br>V2<br>(buck) | 4V<br>24V |
| Switching frequency | 20kHz |
| Inductor | 30µH |
| Capacitor | 150µF |
| Load | 250W |

TABLE 2. SIMULATION PARAMETERS

| **Parameters** | **Specifications** |
| --- | --- |
| Input voltage,<br>V1(boost)<br>V2<br>(buck) | 12V<br>24V |
| Switching frequency | 20kHz |
| Inductor | 40µH |
| Capacitor | 5mF |
| Load | 250W |

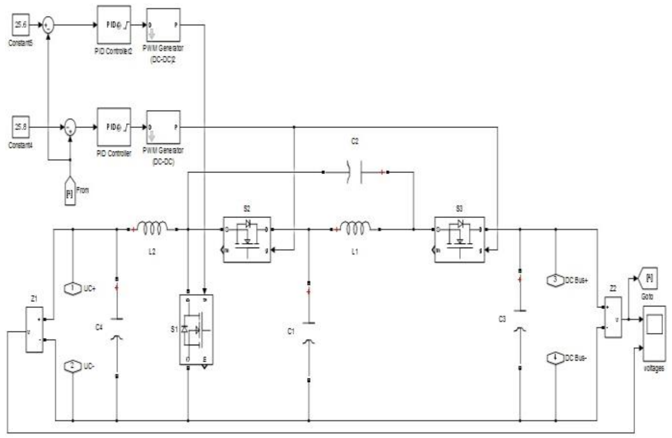


Fig. 7. Simulation of z-source bidirectional converter with control

The bidirectional DC-DC converter subsystem and its gate pulse generation are shown in Fig. 7. The high voltage side of this subsystem is connected to the DC bus and low voltage side to the Ultra-capacitor. The conventional converter subsystem and its gate pulse generation are shown in Fig. 8. One side of this subsystem is connected to the battery and another side to the PMDC Motor.

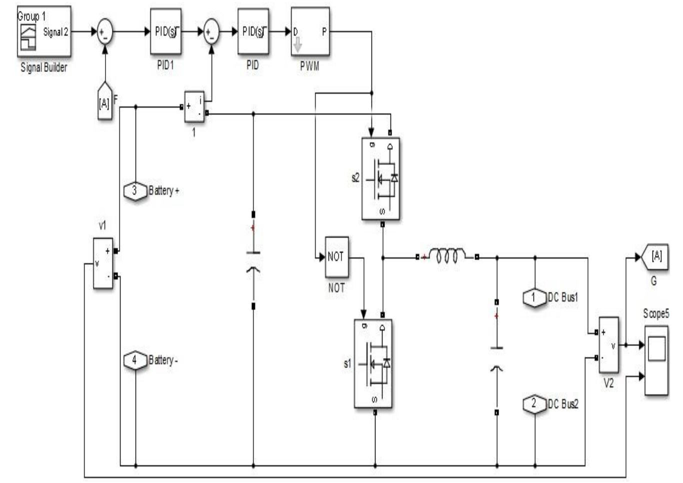



Fig. 8. Simulation of conventional converter with control

To illustrate the working of the system, the speed of the motor is varied by changing the voltage applied to the motor using a signal builder. Initially, a terminal voltage of 24V is applied and is stepped down to 5V at 0.3 sec. This 5V is again stepped to 24Vat 0.6 sec. Ultra-capacitor is initially taken to be uncharged and initial voltage is set as 0V. The battery supplies the PMDC motor during this time and the new bidirectional converter is idle. At 0.3 sec as the terminal voltage is stepped down to 5V, the regenerative action takes place and the new bidirectional converter becomes active and buck operation takes place and charges the Ultra-Capacitor. At 0.6 second, the terminal voltage is again stepped to 24V. The new bidirectional converter again becomes active and it boosts the Ultra-Capacitor voltage and supplies the bus. The initial demand will thus be met by the ultra-capacitor and the battery follows.

*A.* Simulation results

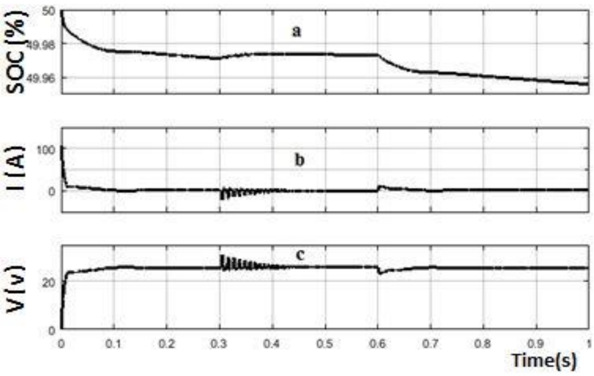



Fig. 9. Inductor currents (a) $L_1$(b) $L_2$

Fig. 9 shows battery characteristics while using this UC-battery hybrid system for EV. Fig. 10 shows the ultra-capacitor getting charged at 0.3 sec during regeneration and discharging during 0.6 sec.

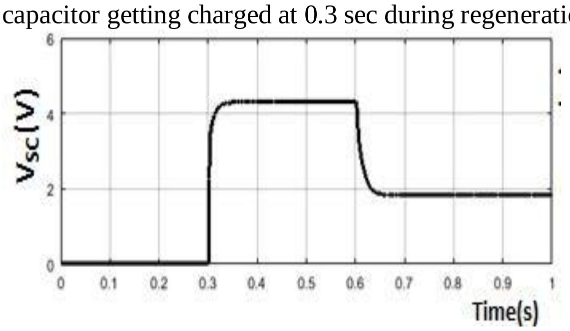



Fig. 10. Super-capacitor voltage

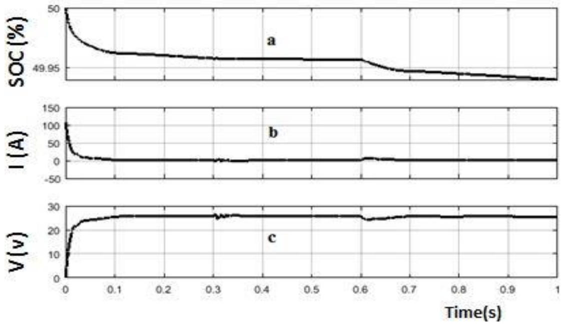
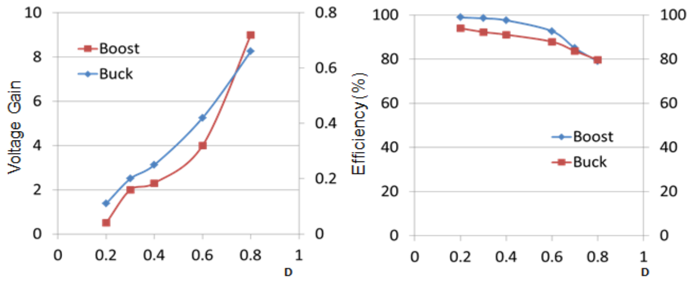



Fig. 11. Inductor current

Comparing the battery characteristics in Fig. 9 and 11, it is observed that the heavy oscillations in battery voltage and current during regeneration while using battery alone is reduced while using a UC-battery hybrid. Terminal voltage oscillations are also reduced while using a UC-battery hybrid.

*B.* Analysis




(a) (b)

Fig. 12. (a) Duty ratio $V_S$ Voltage gain (b) Duty ratio $V_S$ Efficiency

## IV. Experimental Setup and Result

The experimental setup for a battery-ultra capacitor hybrid system for electric vehicles using new bidirectional quadratic converter is shown in Fig. 13. A 12V, 250W PMDC motor is used in experimental setup instead of 24V, 250W PMDC motor. The components used for the prototype are listed in table 3.

TABLE 3. SIMULATION PARAMETERS

| Parameters | Specifications |
|---|---|
| Input voltage, V1(boost) V2 (buck) | 2V 12V |
| Switching frequency | 20kHz |
| Inductor | 20µH |
| Capacitor | 400µF |
| Load | 250W |

Fig. 13. Hardware implementation

Fig. 14 and Fig. 15 shows the openloop output pulse for the converters in boost mode as well as in buck mode. The motor speed is controlled using the conventional bidirectional converter by changing the input to the motor. While the motor is running if the speed of the motor is suddenly reduced, regeneration occurs and there is a slight increase in bus voltage and if the motor is suddenly accelerated there occurs a sag in bus voltage. The openloop outputs of the converters having fixed duty ratio's are shown in Fig 16 and Fig. 17.

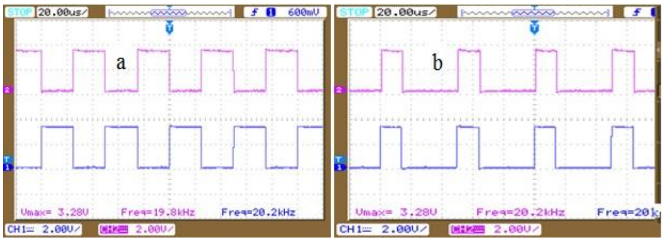



Fig. 14. Gate pulses (a) Conventional converter (b) Z-source converter in buck mode

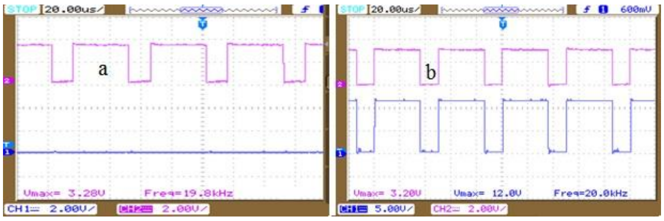



Fig. 15. Gate pulses (a) Conventional converter (b) Z-source converter in buck mode

The closed loop outputs for the z-source bidirectional bidirectional converter is shown in Fig. 18.

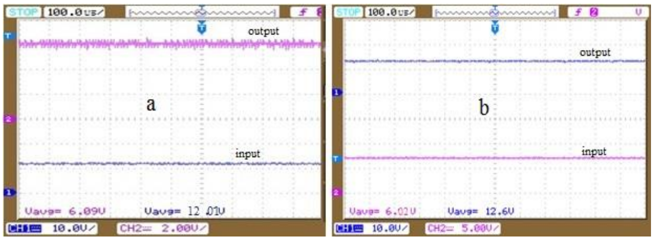



Fig. 16. Conventional converter (a) Buck mode (b) Boost mode

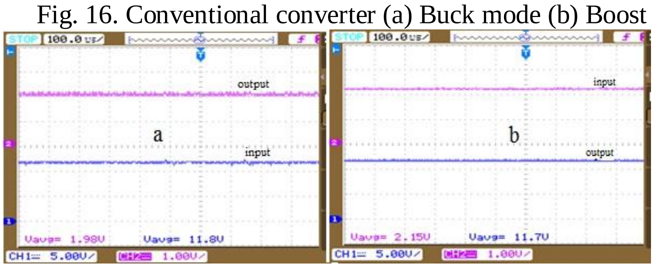
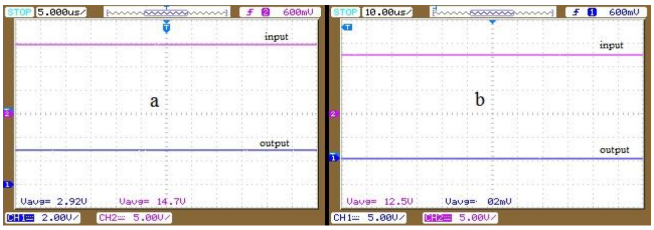



Fig. 17. Z-source bidirectional converter (a) Buck mode (b) Boost mode




## CONCLUSION

The hybrid energy system is used with the objective of taking advantage of the best characteristics of the devices, creating a system that is superior than any of the devices used alone. In this project, bidirectional z-source DC-DC converter with battery super capacitor hybrid system fed PMDC motor for electric vehicles has been introduced. Bidirectional z-source converter offers high voltage conversion and simple control techniques. It can be used to store the super capacitor during regeneration, and also to boost the capacitor voltage and supply the motor load during acceleration. The simulation work is carried out using MATLAB/SIMULINK R2015 software. From the simulation results, it is observed that the large oscillations in the battery voltage and current during regeneration is reduced while using battery super capacitor hybrid system. Super capacitor-battery combination is more suitable for the applications with fast transients. Such system allows to store the energy during regeneration and use this energy when its required. The experimental model of the proposed battery-ultra capacitor hybrid system for electric vehicles is made and the hardware open-loop results match the simulation results. It is suitable for battery charging of electric vehicle.

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