



A NEW TOPOLOGY AND MANIPULATE METHOD FOR A HYBRID BATTERY-ULTRACAPACITOR ENERGY GARAGE DEVICE

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ABSTRACT:

In this paper, battery/ultra capacitor hybrid power storage process (HESS) is proposed for electrical cars, it's used to tremendous dc-dc converter through utilizing extremely capacitor and battery. Additionally it is use the dc hyperlink for the intent of keep the peak voltage value. With the aid of the aid of battery and ultra capacitor they are function The battery is used to charging the capacitor in case of discharge the capacitor. On this case battery is working. It's also used to the regenerating breaking to retailer that vigour in case of autos stoppage the vigour will be loss. The battery lifestyles time broaden by utilizing extremely capacitor. In case of ultra capacitor working, the battery will isolated with vigor deliver. This test is finished effectually and proven output of proposed approach.

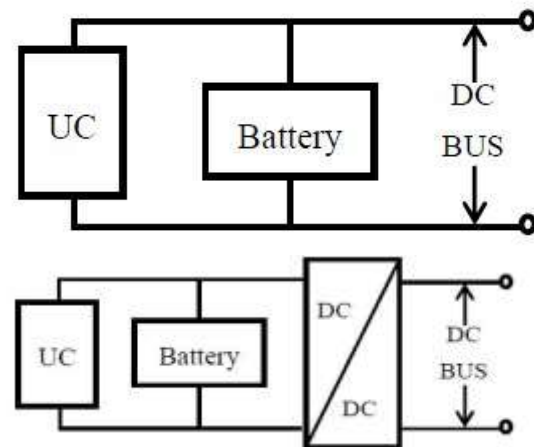
Given the growing issues over the atmosphere and the use of non-renewable power sources, the importance of establishing cars making use of alternative power sources is well-known worldwide. The hybrid electrical vehicle (HEV), which combines the performance of a usual auto with the low emissions of an electric automobile, is the most greatly permitted of the brand new new release of vehicles and is for that reason attracting greater attention [1]. The vigor storage approach (ESS) has invariably been some of the bottlenecks in the development of HEVs. The characteristics of the ESS such because the designated vigour, the special energy and the service lifestyles widely have an impact on the performance of an HEV. A giant amount of research has been carried out on ESSs. Batteries had been essentially the most customary power storage factor for these vehicles hence a ways for the reason

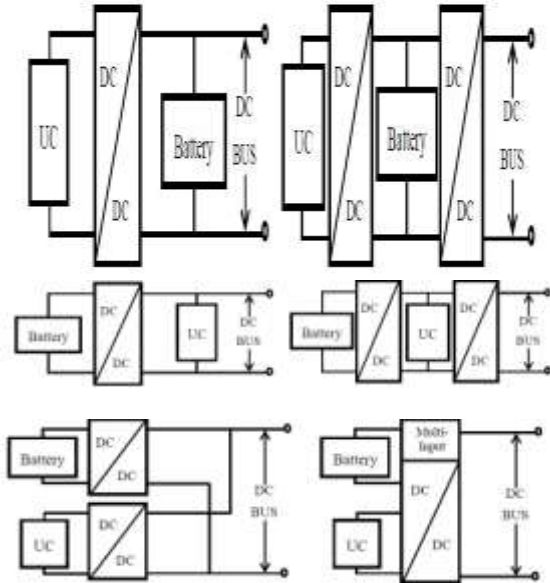
INTRODUCTION:



that of their high vigor density, compact size and reliability [2,3]. The negative aspects of the batteries are without doubt that the negative residences of low temperature, low cycle life and certain vigour [4]. For HEVs, mainly within the accelerating, hiking and braking stipulations, the important requirements for the ESSs are excessive price and efficient charge and discharge potential. If the small capacity battery financial institution is adopted due to the fact that the cost, volume and weight, the battery financial institution will in general work in excessive present charging and discharging stipulations or the energy of the ESS needs to be restrained. If the battery financial institution ability is elevated to fulfill the vigour demand of the vehicle, the cost, volume and weight of the car might be increased. To solve this contradictory, hybrid vigor storage programs (HESSs) combining two or more varieties of storage accessories with complementary aspects were proposed. HESSs composed of batteries and ultracapacitors (UCs) are presently probably the most extensively studied. Usahave much bigger energy densities and much longer service lives but

slash power densities than batteries [5]. In a HESS, as a consequence, UCs are as a rule used to absorb the excessive energy of regenerative braking and give maximum power for acceleration, whereas the batteries are used for car operations involving much less vigor. More than a few architectures for HESSs using batteries and u.S. Have been proposed [6–16]. The most important battery/UC HESS topologies are shown in determine 1. the UC financial institution and battery financial institution are related in parallel with, and immediately to, the DC bus [6].





In up to date years, the energetic parallel HESS topologies shown in figure 1c–h were investigated. The power distribution between the batteries and the UC can be managed by way of the DC-DC converter(s). In determine 1c,d, there's a bi-directional DC-DC converter between the UC bank and the battery financial institution. In these two topologies, the voltage of the UC bank will not be sure by means of that of the battery bank and the DC bus. In determine 1c, the battery financial institution is immediately related to the DC bus in parallel, so the voltage of the DC bus is reasonably more steady than that in figure 1e. Moreover, the

power stored within the battery financial institution can be utilized extra effectively if it does no longer must move via a DC-DC converter. In determine 1e,f, the positions of the battery financial institution and UC bank are exchanged. In figure 1e, the UC financial institution can be used extra effectually, however the voltage of the DC bus varies with the voltage of the UC bank over a massive variety. Mostly, the minimal voltage of the UC financial institution is 1/2 of the maximum. In determine 1b,d,f, one bi-directional DC-DC converter is included to stabilize the voltage of the DC bus and separate the vigor storage accessories from the DC bus. Nonetheless, the overall loss within the process is greater since all of the electric vigor has to flow by way of one additional DC-DC converter. Additionally, the price, volume and weight of the energy digital devices, particularly the high-power components, usually are not proper for the business market at present. In determine 1g, each the battery financial institution and the UC bank are linked to the DC bus by way of a bi-directional DC-DC converter. The extra not too long ago developed multi-enter bi-directional DC-DC converter can be used in



the HESS, as proven in figure 1h. In these two topologies, the power distribution between the battery financial institution and the UC financial institution can also be managed and the DC bus voltage can be stabilized, but the control methods are far more elaborate and the expenditures of the DC-DC converter instruments usually are not compatible for the industrial market. Currently, the topology shown in determine 1c is the one most greatly used. One of the vital negative aspects of this design is that the DC-DC converter have got to tolerate excessive power levels within the process when vigour is being furnished or absorbed with the aid of the UC bank. The necessity of a high-vigour DC-DC converter hampers the fashionable use of an active HESS. Decreasing the required power capability of the bi-directional DC-DC converter in the active parallel structure is an imperative in additional research. In [17], a HESS constitution that reduces the required energy ability of the DC-DC converter was proposed, and the three working modes of this design were discussed. In this design, the snubbercapacitor of the motor drive inverter have got to be eliminated

considering the fact that there's a step trade in voltage when the working mode switches. An additional HESS topology that reduces the desired vigourcapability of the DC-DC converter used to be proposed in [18], however in that design, if the energy ability requirement of the bi-directional DC-DC converter is decreased, the maximum power requirement of the battery financial institution need to be expanded to meet the energy demand of the DC bus. Furthermore, the battery bank can not be charged and not using a DC-DC converter. To solve the aforementioned issues, a brand new HESS configuration and manage approach are proposed. The required energy capacity of the bi-directional DC-DC converter in the proposed HESS is diminish than that within the average structure in determine 1c, and the energy standards of the DC bus are fully satisfied. With the proposed manipulate method, there is no step voltage exchange when the running mode switches. The controller chooses the proper working mode and distributes the energy between the batterybank and the UC financial institution centered on the working status of the HESS on the earlier time step. This



technique reduces the energy loss and the warmth generated by means of the entire procedure given that each the battery bank and the

UC bank can also be charged and discharged with out utilizing the bi-directional DC-DC converter

Vigor Storage system: The resolution of voltage storage system or vigour storage component. The traits of battery just like the storage ability is high however power density is much less and additionally it is storing time is extra. It will broaden the size when voltage range will develop. The dimensions of battery is the largest obstacle to carry from one location to a further place. And also utilising the cars and any establishing device. The characteristics of ultracapacitor is the vigor density may be very high but storage potential is negligible. But the blend of an ultracapacitor the voltage is increases and dimension will also decreases. The rate of high voltage battery may be very high however the combo of low voltage battery and ultracapacitor to produce excessive voltage. By way of combining of both the price of supply very decreases.

After growing the voltage utilising the dc link it is going to hold the peak voltage and fluctuation the wave kind.

Protection of Battery: it is rather major to develop the life time of the battery and wholly use the vigor. By means of utilizing the ultracapacitor it'll help the increase the velocity of cars and also the working time of the battery may be very much less considering that the maximum time capacitor is working. Additionally it is very principal to store the vigor at the timing of preventing the automobiles. When automobiles is stopping that time some distance will cover for making use of the regenerative braking procedure. It'll store the energy by way of regenerative braking, in that point the motor is behaves like a generator [7].

Whole rate Of mission: examine to existing process it is less cost and smaller dimension working characteristics like pace is very good on account that the present method the traditional battery is used. The traditional battery of voltage range rely upon dimension of the battery. Utilizing the ultracapacitor and battery the vigor density, vigor density

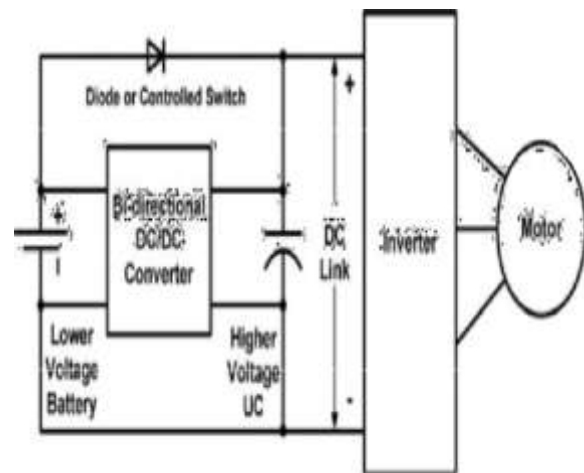


and efficiency will increase. Additionally, total rate is less. The management of battery and fee is very essential in view that it is straight proportional to the rate of the assignment and likewise effectivity. Weight of vehicles is raised then effectivity is decreased and likewise fee raises.

Proposed of Hybrid vigor stored approach:

The conventional capacitor and dc-dc converter isn't get correct top vigor demand. The potential of capacitor could be very not up to ultracapacitor. By means of making use of ultracapacitor and battery handy to get height vigor. It is controlled via dc link. proven the simulation battery energy. It's first introduced in usa by means of applying riding cycle. The first time cycle was once running 12km and direct stop. Then highest velocity is get ninety one km per hours and common pace 31 km per hour. By taking out the discontinue condition and growing the speed. It's using the mixture of battery and ultracapacitor. The charging and discharging system is expand with the aid of utilizing ultracapacitor. In keeping with simulation to find the traditional speed and top vigor. It

is very good compare to current procedure. The difference between top and common vigor. Consider a water cane and mug. The power density of water cane could be very high however power density is much less however in



A mug the power density is less but vigor density is high. For example like discharging the water. The mug will rapidly discharge with evaluate to water cane. The ordinary worth is water cane and top price is mug. Centered on the average inspiration design the system in fig eight. The battery is connected to dc-dc converter. And it's also linked to diode or any controlling switch and bi directional dc-dc converter linked to the ultracapacitor. The battery voltage is



elevated by means of dc-dc converter. It is instantly charging the ultracapacitor.

In the operation of automobiles the provide individually depending upon battery and ultracapacitor. After that the give given to the dc-dc converter. In the power supply depend on the battery and ultracapacitor supply. The using of automobiles dependon changing the vigourdeliver.The voltage variety of the battery is less than capacitor. Then give is given by using the ultracapacitor. It is high voltage operation however in the case of ultracapacitor will discharge then deliver given by way of battery and in addition charging the capacitor. It's going to operating as increase converter.

Mode I: car Low regular velocity Operation: on this case the battery voltage is greater than ultracapacitor voltage. The battery voltage provide going to diode. After that it'll go to load. In identical time capacitor will charge The provide is going inductor and diode is forward to fundamental provide. It is charging the capacitor and in addition provide goes to dc link. Dc link is easy to manage the peak

worth given that the voltage variety is much less.

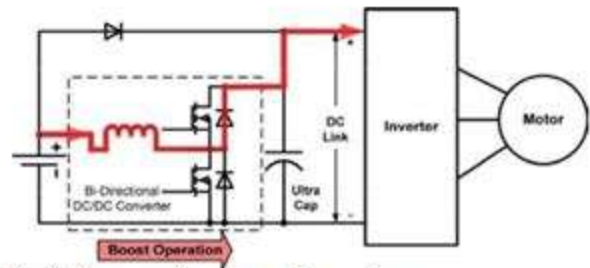


Fig. 9: Low consistent speed operation

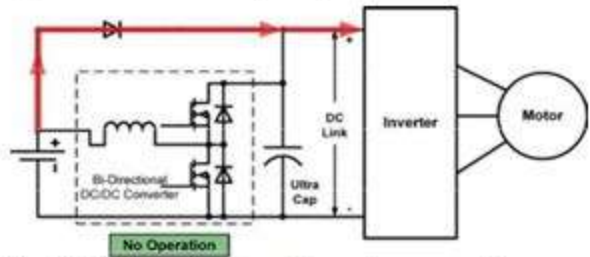


Fig. 10: High constant speed operation energy flow.

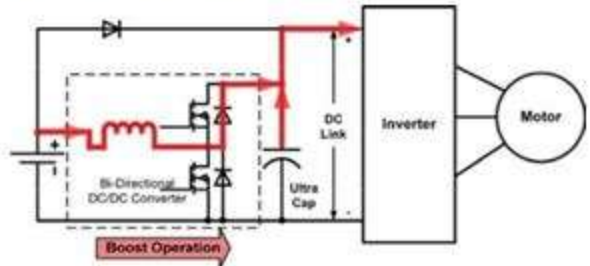


Fig. 11: Phase 1 Acceleration

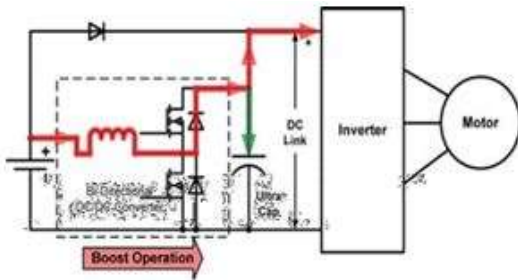


Fig. 12: Phase 2 Acceleration

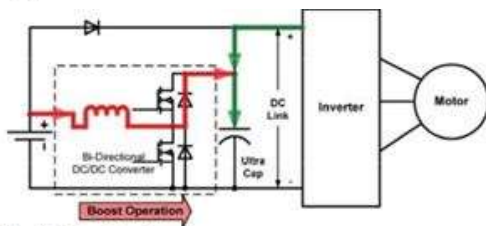


Fig. 13: Deceleration

Mode II: high constant speed Operation: The battery provide immediately given to the diode or any controlling switching device. The deliver is immediately given to the inverter. In this case the capacitor won't charging and discharging. And dc-dc converter is also not working. The voltage supply is bigger than prior circuit. Within the earlier circuit the voltage is distribute two section. One is for charging motive of capacitor and another is given for the driving the weight.

Mode III: Acceleration: in this case the supply is given with the aid of battery in the

best way of increase converter and ultracapacitor is also. It is very excessive pace operation due to the fact that providing source is 2 ultracapacitor and enhance converter operation. In this case the function of dc hyperlink could be very vital. Since the peak vigour give is range and in addition more fluctuation. And after that going to inverter and motor. On this case the deliver is given via improve converter and capacitor is charging also via equal deliver. The pace of vehicles is lessen evaluate to above circuit. In view that above circuit give is given by way of raise converter and ultracapacitor but here supply is given by way of most effective enhance converter. Equal provide additionally going for charging the capacitor. The dc hyperlink handy to operate seeing that top voltage is much less.

Mode IV: Deceleration: Deceleration mode operation motor behaves like a generator. It will supply the supply when autos will stop the given give. But walking automobile won't stop at a time. On this case best motor behaves like a generator. The generator deliver straight given to the capacitor and capacitor will charge. It is usually low pace operation. There is no dc-dc operation



happened. In this case the generator provide is given to the enhance converter. After that it's going to again charging the battery the method is most effective occurred when ultracapacitor is cost. The dc-dc converter behaves as a bulk converter.

CONCLUSION:

This can be a new venture in evaluate to current system. This challenge is fully established on battery and ultracapacitor. There is no have to matching the give. In this undertaking used totally dc-dc converter. In case of ultracapacitor will discharge the voltage then the voltage variety can be less than battery voltage, after that battery is working. On this undertaking the battery use very much less often capacitor is working, that's why the lifetime of the battery will increase. Additionally it is reducing the undertaking of the battery range. The proposed process may be very small measurement evaluate to current approach. Also this undertaking having rate may be very less in examine to existing system and scope is extra.

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