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Power Electronics Based Energy Management System with Storage

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ABSTARCT:

Electrical energy storage has an important role to play in improving the performance of electric drive systems in the future. This paper proposes a new topology of power electronics and power electronics integrated with energy storage system and unit investment. This structure reduces weight and component number compared with the topology of the first, but still allows the use of standard machines. Energy savings and extension system offers full size. Study on the transport system combines year class black city tram, and it seems so obvious that you can achieve energy savings by using energy storage intensively with the proposed structure. The proposed maximum energy available during braking system depends on the kinetic energy and therefore the speed and load of the tram. The actual energy that can be obtained is a function of the more complex, depending on the degree of power and storage system energy, time and function, of course, driving a vehicle during normal braking and speed, and which uses the energy and balance energy recovered to overcome mechanical losses.

INTRODUCTION:

With the growing emphasis on the elimination of coal in the world economy and the achievement of works of security, energy and public transport to electrified increasingly important role in society. Compared with the means of personal transportation, and provide a lot of energy and public transport check, especially at peak times of passengers. And you can achieve carbon savings of others before electricity grid to allow renewable energy and low carbon to provide the driving force. The energy consumed throughout the electrified this system can not be reduced further by installing energy storage systems (ESSS) on board the vehicle. energy storage devices can be used to replenish energy during braking, energy and other brake resistors or waste mechanical braking. This energy can then be reused. Energy is stored on board the aircraft using capacitors electric double layer system (EDLC) it is

one of the promising ways to prevent failure of renewable energy rolling tools. Energy storage devices, the transformer loading / unloading and continued the main source of DC power.

II. VIABILITY ENERGY STORAGE

This technology has a long history. Build train stations in central London with the rise, this means that the trains had to climb the gradient entering the station and when he reached the station. This form of low energy loss from a small shop. Modern technology today can be more effective. The study showed that demand for energy storage in the race LRT west coast of the United States system and provide the potential energy of 23%. Financial considerations to emphasize the benefits of reducing electricity demand during the summer, although this depends on the customs and traditions of energy tariffs. But, however, the search engines and electric-powered vehicles have been shown to achieve maximum approach to storage systems accrue interest and added to reduce excess weight.

The maximum power available during brakingIt depends on the kinetic energy, and thus the speed and load tram. The actual consumption of energy that can be collected in a more complicated job, according to the power system and storage of rated power, working time driving a cycle trolley through the natural course and braking due to energy balance and found the energy used to overcome mechanical losses. For this study, the braking force personnel and vehicles in the long tram typical audience Blackpool to use the transport system of the actual unit (measure) and the data cycle as part of this research project. And to determine the effect on engine through simulations using the integration of the electrical system of the cycle and the mechanical effects and tram motor model cycle. Media experiments to validate the model of the nature of the process of energy storage in situ without city trams and trolley class C (low cost and high efficiency concept car under development). By applying function saturation braking force personality, limiting the ability to sort the conversion, then the combination of the braking force on the engine cycle, the energy captured using the adapter specific power can be found. Note that this is due to planning Blackpool tram, and plenty of long tram "Costa also short brake Motor / / Cycles. Choose a point on the curve where Flatten slots allow conversion to be selected catches and there is enough energy available. Choose two options to consider. The first is the conversion of 50 kW, 3.1 MJ potentially allowing braking energy to be captured during the session. This solution reduces the size of the opening to ensure that

a large proportion of the braking energy available for collection. 100 kW The second option, which allows more energy to be arrested relationship, is also considered.

A. choose energy storage

Traction and durability is critical in that the energy storage traction application is to leave whenever he starts the car and stopped, and this could be equivalent to hundreds of times a day, it is essential that the energy storage device due to the load approval -Discharge cycle deterioration is minimal. It should be possible maintenance requirements lower level. It should also be high energy and power density, but the severity of the task is less important. storage devices intense energy meet these needs. As the moving parts, which increases reliability and density mobile applications. In the ensuing discussion, too, capacitors can be used to store energy, and therefore must convert electricity to communicate very intensely remaining source system (DC). To discuss the design and details of the decisions of the city during class service will use the tram in Blackpool tram.

III. Power Management

During braking, and should benefit as much as possible of the braking force is the maximum stored in the ultra capacitors. Braking energy dissipated not stored by the energy storage device in the braking resistors. However, only the energy stored by the energy conversion device and energy storage is needed It is the highest level of effort beyond that is not allowed. Typically, operating systems convert Do not allow ultracapacitors keep operations fall below the minimum effort: input voltage range for several reasons. Little extra energy is free to low voltage three-quarters of the energy available in the upper half of the voltage range. And extracting energy at the same speed requires more energy at lower voltages. Therefore, when the voltage ultracapacitors is less than the minimum of effort, which provides traction completely provide traction. The analysis shows that 40% of the energy used by dissipated in the braking of the vehicle. This potential to be used to charge the energy storage device power. Also be a device for storing energy loss and, therefore, are not braking energy calculation does not represent the potential to save energy.

IV. Adapter choosing pre-ART

While both sides of the solutions of the track and of the table, it is possible, after the energy storage units in the tram will put next solution to this problem is a feature. When several trams operate in the same part of the network, and to increase the storage capacity of domestic energy if each storage TRAM maintains itself and installing energy storage

devices in the car that is not a new idea. Yverdon girobús development began in 1945. He worked for the wheel of the bus, which was a traditional generator. flywheel assembly load in three aspects periodically point. And the need to girobús complex system, consisting of three interconnected motors through reduction gears. All cars can run on two different electrode configurations, giving an effect six engine and transmission speeds of the different geological covering the required speed. Such a mechanically complex system and perhaps undesirable led to the development of a limited Jaro- BUS

SIMULATION MODEL OF THE PROPOSED SYSTEM WITH PV CELL:

The simulation circuit of simplified power converter for integrated traction energy storage using PV cell for mixed mode operation is shown in fig 6.15.When pulses are given to traction inverter and energy storage source inverter then it is known as mixed mode operation.

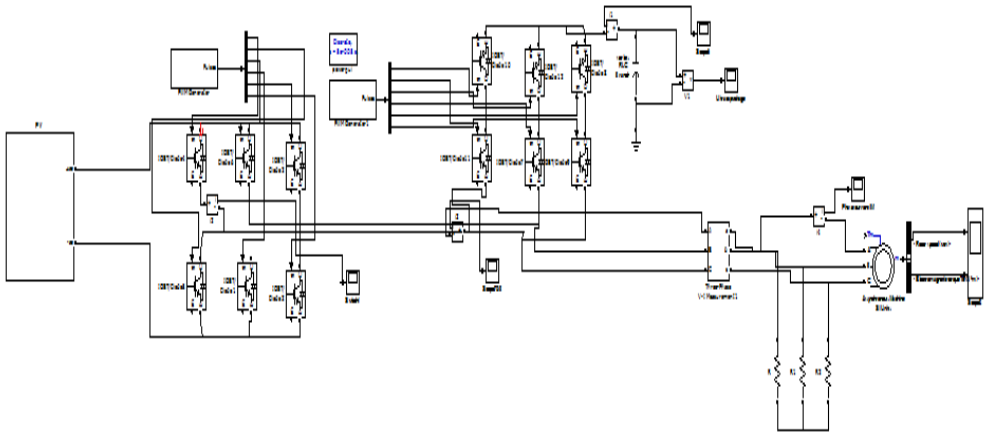


Fig 6.15 Simulation circuit of the proposed mode

The waveform of current across switch 1 for mixed mode operation using PV cell is shown in fig 6.16.The pulses are given to the traction inverter and the current across switch1 is a square wave.

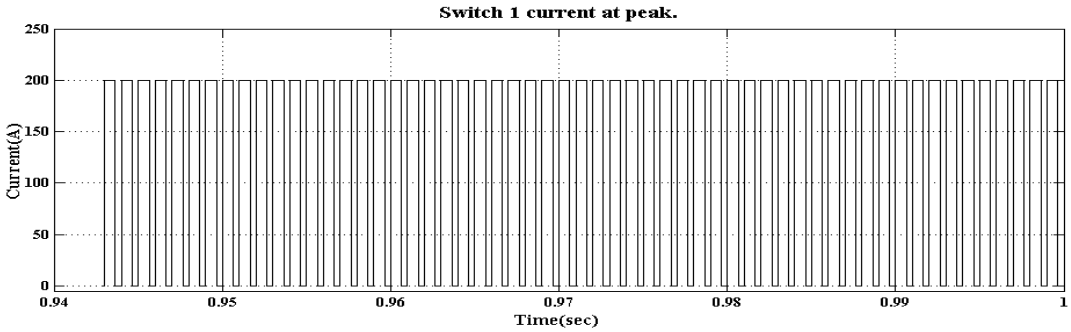


Fig 6.16 Switch1 Current.

The waveform of current across switch 7 &8 for mixed mode operation is shown in fig 6.17.The pulses are given to the energy storage source inverter and the current across switch 7 & 8 is a square wave.

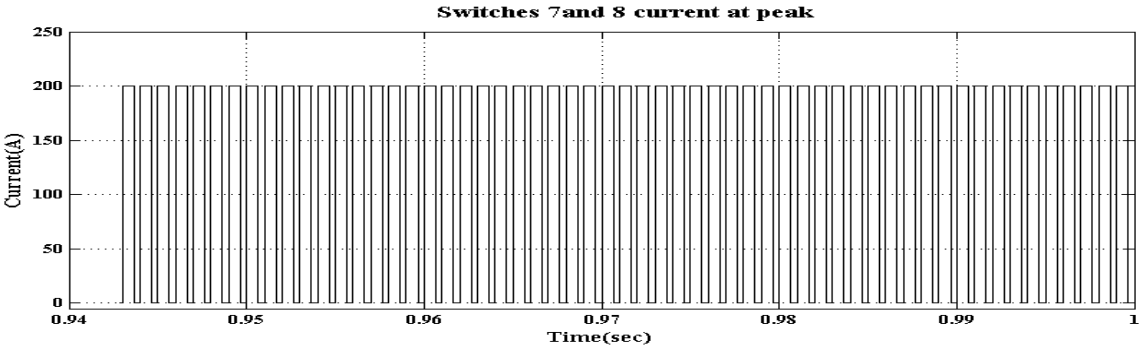


Fig 6.17 Switch 7&8 Currents.

The waveform of capacitor voltage for mixed mode operation is shown in fig 6.18 and it is maintained at a constant voltage of 420v.

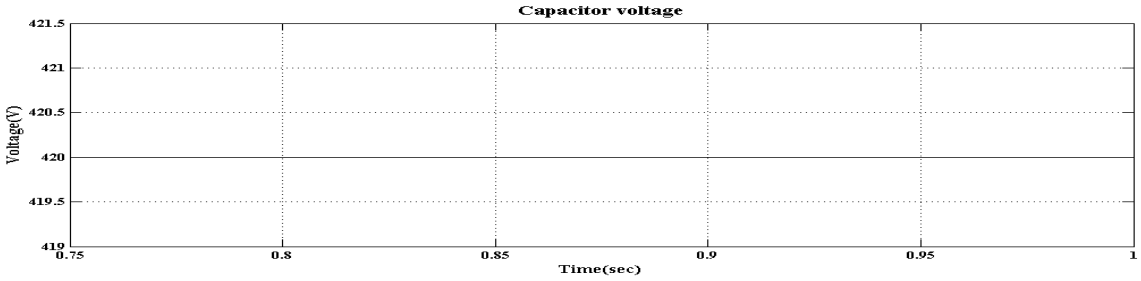


Fig 6.18 Capacitor Voltage.

The waveform of motor phase current for mixed mode operation using PV cell is shown in fig 6.19.

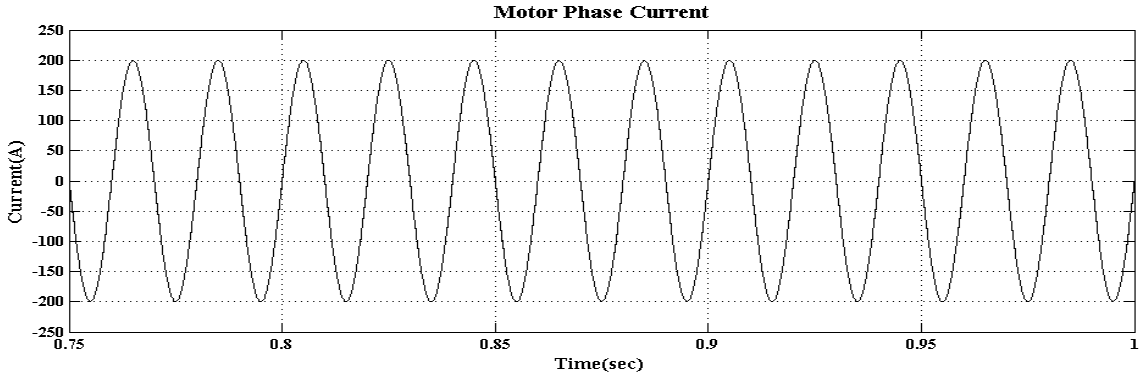
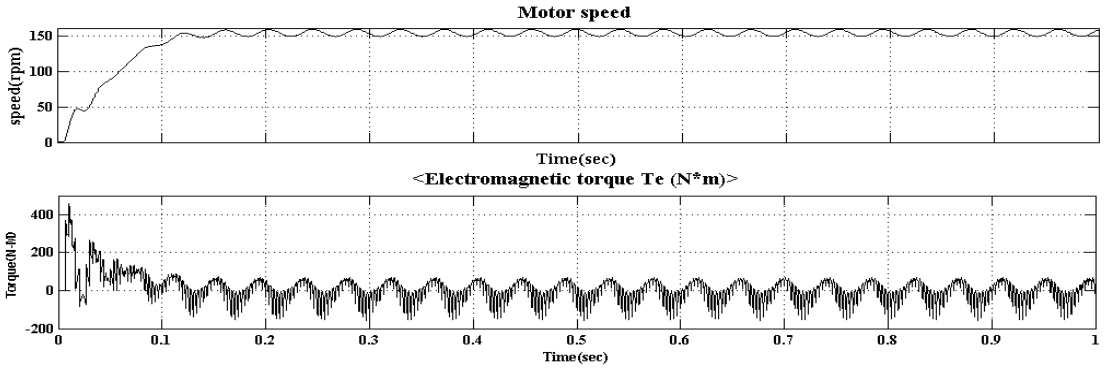


Fig 6.19 Motor Phase Current.

The waveforms of speed versus time and torque versus time is shown below fig 6.20. Depending up on the load conditions the speed and torque waveforms are fluctuating.



6.20 Speed and Torque Waveforms

CONCLUSION

This project has presented a new converter topology for light rail traction. The Blackpoll tram system in the U.K. has been taken as a study case. It has been shown that energy storage onboard each tram can substantially reduce energy use per kilometer. A new converter circuit has been presented with PV cell. It has been shown that further energy savings(30%) per kilometer can be achieved with the novel converter as opposed to conventional power electronics topology. A reduction of energy consumption is therefore ecological and - in the near future - economical reason able.

It has been that ultra capacitor used is more efficient at energy cycling than batteries. Ultra capacitors are electrical energy storage devices, which offer high power density, extremely high cycling capability and mechanical robustness. It has been shown that this topology reduces weight and component count when compared with previous topologies. The simulation results are obtained using MATLAB/SIMULINK software.

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