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A NOVEL ENERGY MANAGEMENT FUNCTIONS FOR SOLAR PV-DRIVEN SRM FOR EVS

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ABSTRACT: In this paper, a novel energy management functions for solar PV-driven SRM for EVs is implemented. The main intent of this system is to reduce the emission of green house gases. Mostly this is used in the applications of electrical vehicles, drive applications and industrial applications. Photo voltaic are mainly used to reduce the reliance on batteries of vehicles. Basically, in earlier system PI controller is used and for MPPT tracking P & O algorithm is utilized. Because of this consumption of power and voltage will be high while tracking. To avoid this instead of PI controller, Fuzzy logic controller is utilized. For MPPT tracking, incremental conductance (IC) is utilized. The entire design is simulated using MATLAB/Simulink software. Simulation results shows that SRM drive for electric vehicle applications by using fuzzy logic controller gives effective results compared with earlier systems.

KEYWORDS: Electrical vehicles, green house gas, Switched Reluctance Motors (SRM), photo voltaic panels, vehicle batteries, board charging, Maximum Power Point Charging (MPPT), Incremental Inductance (IC).

I.INTRODUCTION

An Electric vehicle (EV), additionally called an Electric drive vehicle utilizes at least one electric engines or footing engines for impetus. The significant segments of an electric vehicle framework are the engine, controller, power supply, charger and drive Train [1]. Great execution factor speed dc drives relies vigorously upon control system and controller structure. These exhibitions incorporate various angles for example, Quick ascent time, least overshoot, least consistent state mistake, high productivity, Unwavering quality and economy. The ordinary straight controller for example, Proportional Integral, Proportional Integral

Derivative have been utilized in numerous applications [2]. The Integral Proportional controller has been applied with dc drives. The controllers are touchy to framework parameter varieties and burden aggravation. The exhibition shifts with working conditions, and it is likewise hard to 15 tune controller increases both on- line and disconnected. The expanded profitability and improved item quality requests quick reaction and parameter– obtuse vigorous drive frameworks[3].

With the extension in propels mechanical Electric vehicles and cross breed electric vehicles are progressively concerned these days because of its capable activity. In this the force can be produced by the Solar and put away in batteries. When the vehicle is under running condition the force is traded on the motor and draws the current from the battery. In spite of the fact that they are just at a moderately undeveloped stage as far as market entrance, electric vehicles speak to the most earth agreeable vehicle fuel, as they have definitely no outflows The active created to control the Electric vehicles and the active to move the vehicle is 97 percent cleaner as far as toxic contaminations[5]. The upside of electric engine capacity to give power at practically any motor speed.

One of the huge contentions made via vehicle organizations against the electric

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vehicles is that Electric vehicles are fueled by power plants, which are controlled essentially by color Hydra, etc. In any event, expecting the power to control the Electric vehicles isn't delivered from house top sun oriented or flammable gas; it is still a lot of cleaner than fuel created from oil. The significant concerns confronting the electric vehicle industry are extended top speed and cost. At last, the batteries will decide the expense and execution of the Electric vehicles. The main way electric vehicles are going to have a major effect in individuals lives that they can do everything a fuel vehicle can do and the force is the limit which can taken from vehicle. They need to look extraordinary, and they must be sheltered.

The electric vehicle is driven by the battery. On exchanging the vehicle engine takes current from the battery which is gathered from the sun powered and put away in the battery. The engine changes over the electrical vitality put away the battery into the mechanical active and subsequently the vehicle pushes ahead. At the point when the vehicle turned on the engine additionally turns over pivoting which is associated with the generator by creating the force.

The synchronous generation will begin the electric vehicle driving. Here synchronous generator has been utilized in the light of the fact that it can work at low force. The yield of the generator is alternating sort which is equivalent to the battery. Consequently it tends to be changed over into DC with the assistance of rectifier circuit. The rectifier circuit change over this AC into DC .The DC segment is gone through the channel circuit which expels music. Then the DC is put a way in the ultra capacitor. Subsequently the force can be produced with no outside powers and this procedure is called self generation.

II. SOLAR PV POWERED SRM DRIVE

Now a day's electric cycles and bikes are controlled by utilizing the power. The power is assembled in a lead corrosive battery, which drives at least one electric engine. The charging time ordinarily takes around eight hours to energize. Vehicles will takes more time to energize than that of filling a petroleum tank, however this should be possible short-term on a stream charging.

Engine controllers are a significant piece of drive arrangement of an electric vehicle. Engine controller in electric vehicles offers improved execution, productivity and controllability. In the event that an electric vehicle maker needs to fabricate a minimal effort electric vehicle, at that point picking an ease controller would in the end influence his decision for engine. For low voltage electric engine broadly utilized in electric vehicle cost of controllers of various electric engines with same voltage and yield power appraisals.

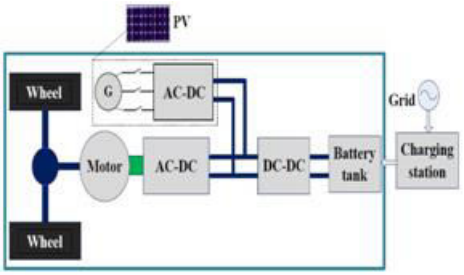

Fig. 1: BLOCK DIAGRAM OF SOLAR PV POWERED SRM DRIVE

Also, the grid turns out to be absolutely uncaring toward some specific vulnerability. This standard stretches out to demonstrate the parameter vulnerabilities, aggravation and nonlinearity that are limited. From a functional perspective, grid takes into account controlling non linear procedures

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subject to outer aggravations and overwhelming model vulnerabilities.

In the electrical mode, the electric engine is driven by the electric battery which can be charged in two different ways (sun oriented charging and regenerative slowing down) and the brushless DC engine is utilized. In the motor mode, the inward ignition motor is utilized to drive the vehicle. The petroleum derivative can be saved and vitality will be recovered by utilizing this framework.

The electric vehicle active source has been distinguished the significant hotspot for the electric vehicle. In spite of the fact that there has been an extraordinary advancement over the most recent twenty years being developed of the active stockpiling framework in the electric vehicle is the most vulnerable piece of the electric vehicle. The lead corrosive battery is still most broadly utilized battery in an electric vehicle. Among the different batteries accessible, for example, NiCd, NiMH, Zebra battery, for an everyday driving reach up to 60 km the lead corrosive battery is acceptable. This applies to traveler vehicles more over.

There are different sources accessible for the electric vehicle like the battery, ultra capacitors, flywheel, and power module. In any case, the subject to a solitary active source, the utilization of various active sources, or what is alluded to as hybridization of active sources, can wipe out the tradeoff between explicit and explicit force. For the hybridization of two active sources, one is chosen for high explicit vitality while the other is chosen for high explicit force.

Like that there are battery and battery half and half, battery and ultra capacitor cross the breed, battery and ultra high-speed flywheel crossover, energy component and battery mixture. There are different battery sources accessible for example lead corrosive battery, nickel-cadmium, nickel metal hydride, lithium polymer/particle, and Nitrium nickel chloride. At the point when batteries are chosen, there are different tradeoffs to be made among few models. For instance, the lead corrosive battery offers the value of an ease and high explicit force; however the negative marks of moderately short cycle life and low explicit vitality, while the nickel-metal hydride battery has generally high explicit vitality.

Power used to control the vehicles is for the most part given by the power lattice and keep in the vehicle's batteries. Energy components are being investigated as an approach to utilize the power produced on board vehicle to control electric engines. In contrast the batteries, power devices convert substance active from hydrogen into power. Vehicles that sudden spike in demand for power have no tailpipe emanations. Discharges that can be ascribed to electric vehicles are created in the power creation process at the force plant.

The benefit of utilizing motor is that they dispose the differential misfortunes and streamline the drive train. These engines are associated with each wheel independently. The taking care and soundness of the vehicle is improved by utilizing this auxiliary unit. In any case, in the majority of the electric vehicles, two variable resistors are utilized for well being reason. In the event that one variable resistor neglects the work, the other variable resistor can be brought into the work. The sign gave by the variable resistor is conveyed to the engine controller. If there should be an occurrence of two variable

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resistors, the engine controller peruses both the variable resistors and considers the further activity. In the event the signs gave by both the variable resistors are not same, at that point the engine controller doesn't work.

Hence a fuzzy controller is used in proposed system which is discussed in detail manner in below section. The reason for this paper is to introduce different technique where scientists have created to improve the driving extent.

III. PROPOSED SYSTEM

The below figure (2) shows the circuit diagram of proposed system. In the proposed work, the plant (vehicle) has one input. This input is to give straight speed and the other is to give directing point input. The direct speed is given by a Permanent magnet synchronous engine and the guiding edge is given through a stepper engine. Since in journey control, the framework needs to keep up a consistent speed. So the genuine speed from the vehicle is taken care of back and contrasted and the information reference speed.

These two signs are thought about the controller and the yield power is transformed from the chopper. This yield signal from the chopper is sent back to the engine. Subsequently contemplating the exhibition of the yield power from the chopper the speed of the engine can be constrained by the engine controller.

A voltage controller is associated with the sun based bike and it is ordinarily introduced between the sun based boards and the engine controller. This is done with the end goal that the force yield of the sunlight based on the differing. Hence a voltage controller is associated between these segments to make the contribution of an engine controller as consistent. The voltage controller ordinarily utilized in this sort of utilizations support converter. The voltage controller consistently gives the engine controller with a non differing voltage as information. It is along these lines used to for voltages.

Based upon the kind of the electric vehicle, different innovation territories are being worked upon. One of the innovation regions in the electric vehicles is for improvement of more current control designs. Scientists are taking a shot at a wide range of electrical topologies and control procedures to improve the general execution of the electric vehicles. These topologies are basically driving for the electric engine. Advancement of battery charging circuits is another exploration zone. Different battery chargers for example on board, off board and remote chargers are being created.

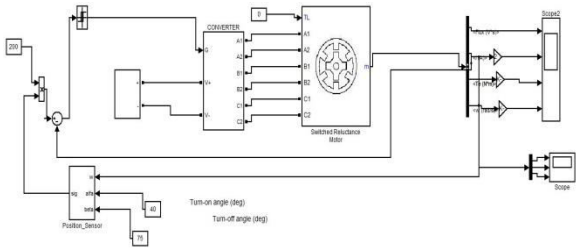

Fig. 2: CIRCUIT DIAGRAM OF PROPOSED SYSTEM

Stability of grid and load management of electrical are the board issues are likewise concentrated broadly regarding the electric vehicles. Utilizing the battery in electric vehicles, over abundance network active from the sustainable can be put away and furthermore the similar battery can be utilized by the framework administrator to enable the matrix to from the momentary voltage hangs and plunges brought about by load changes. Regardless of this scholastic

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level research on different angles, the whole development in the capacity gadget driven electric vehicle industry in the business fragment is centered on a solitary issue. This issue is to broaden its driving separation with longer charge lengths.

IV. RESULTS

Fig. 3 presents the simulation results at mode 1. The load torque is set as 35 Nm, the PV panel voltage is controlled at the MPP. The freewheeling current is used to charge the battery.

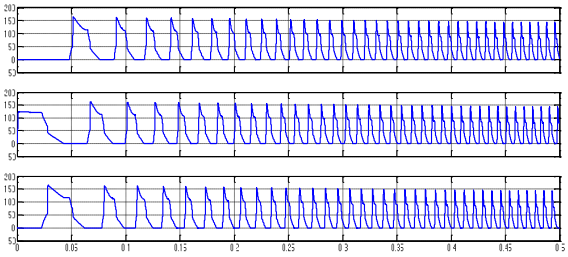

Fig. 3: SIMULATION RESULTS OF DRIVING-CHARGING MODE-1

Fig. 4 presents the simulation results at mode 2. The load torque is set as 35 Nm, the PV panel voltage is controlled at the MPP. The freewheeling current is used to charge the battery.

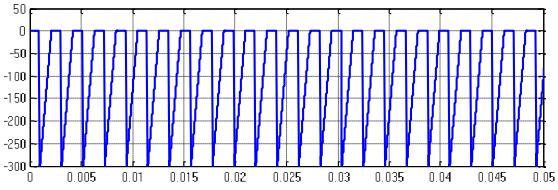

Fig. 4: SIMULATION RESULTS OF DRIVING-CHARGING MODE-2

Fig. 5 presents the simulation results at mode 3. The load torque is set as 35 Nm, the PV panel voltage is controlled at the MPP. The freewheeling current is used to charge the battery

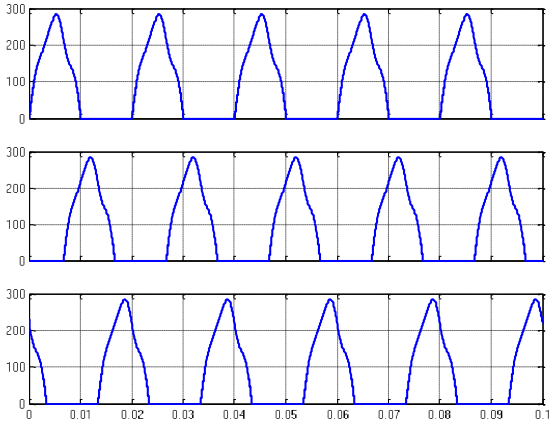

Fig. 5: SIMULATION RESULTS OF DRIVING-CHARGING MODE-3

Fig. 6 presents the simulation results at mode 4. The load torque is set as 35 Nm, the PV panel voltage is controlled at the MPP. The freewheeling current is used to charge the battery

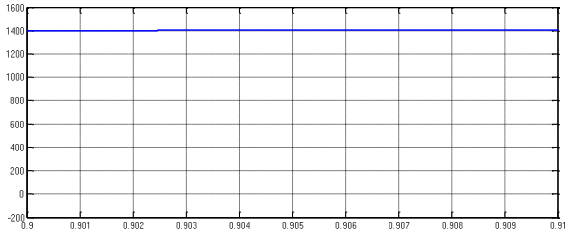

Fig. 6: SIMULATION RESULTS OF DRIVING-CHARGING MODE-4

Fig. 7 presents the simulation results at mode. The load torque is set as 35 Nm, the PV panel voltage is controlled at the MPP. The freewheeling current is used to charge the battery

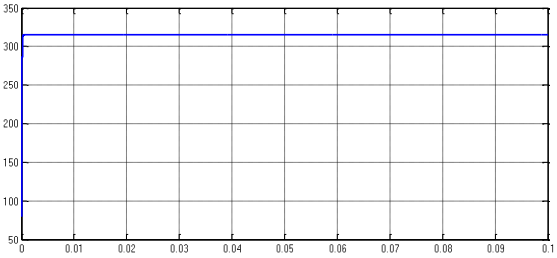

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Fig. 7: SIMULATION RESULTS OF DRIVING-CHARGING MODE

Fig.8 is for grid-charging. The positive half current quality is better than the negative half that is caused by the change in the grid-connected inductance.

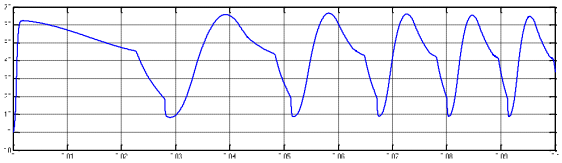

Fig. 8: SIMULATION RESULTS OF SINGLE-SOURCE DRIVING MODE

Fig. 9 and Fig.10 is for PV-charging. Fig. 9 presents the step change from stage 1 to 2. In stage 1, the battery is low in SoC. In order to achieve MPPT of the PV, the constant-voltage control is employed and the PV output voltage is controlled at MPP (310 V), as shown in Fig. 9. In stage 2, a constant voltage is adopted; the reference voltage is set to 355 V. As shown in Fig. 9, the charging converter output voltage is controlled at reference voltage in the step change from stage 1 to 2. In stage 3, 1-A trickle charging is also achieved, as shown in Fig. 10.

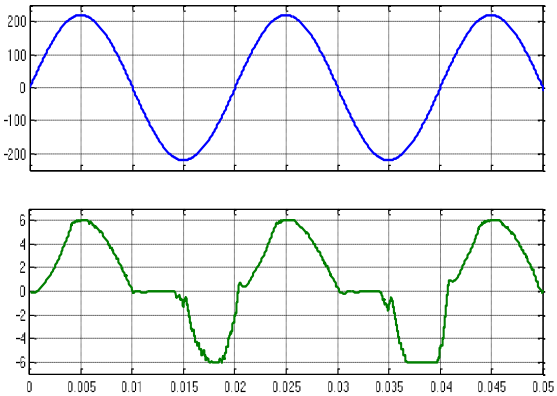

Fig. 9: GRID CHARGING (MODE 5)

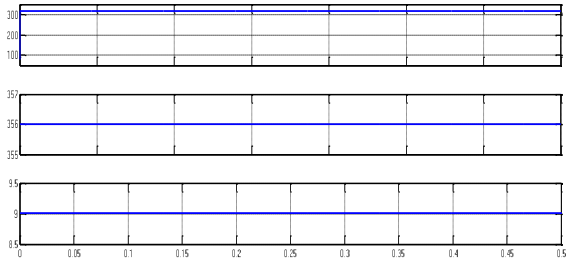

Fig. 10: PV CHARGING MODE 6 (STAGES 1–2)

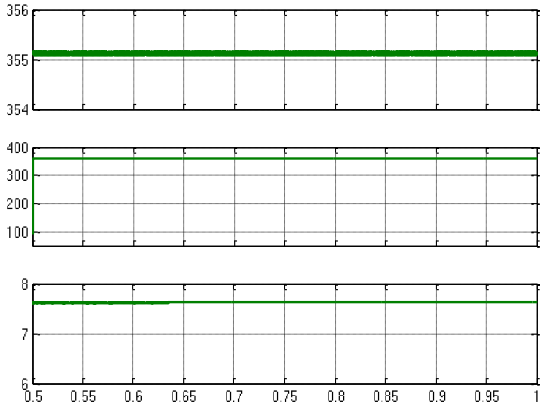

Fig. 11: PV CHARGING MODE 6 (STAGES 2–3)

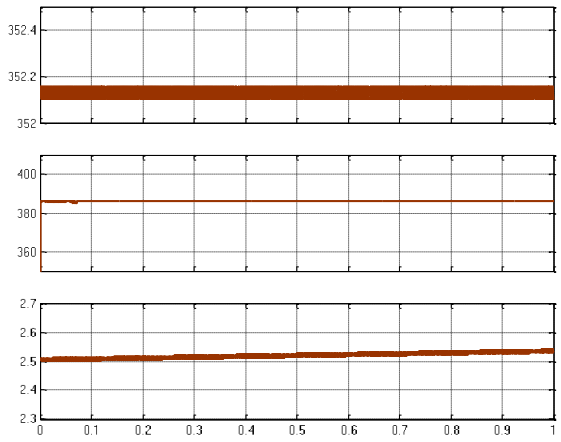

Fig. 12: PV CHARGING MODE 6 (STAGES 2–3)

V.CONCLUSION

Hence a novel energy management functions for solar PV-driven SRM for EV was

implemented. In these IC is used in MPPT technique to control the proposed system. Photo voltaic are mainly used to reduce the reliance on batteries of vehicles. The entire design is simulated using MATLAB/Simulink software. Simulation results shows that SRM drive for electric vehicle applications by using fuzzy logic controller gives effective results compared with earlier systems.

VI.REFERENCES

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