

**SOLAR ENERGY BASED HYBRID ELECTRIC CAR  
MODEL USING MATLAB SIMULINK**

*A project report submitted in partial fulfillment of the requirements  
For the award of the degree of*

**BACHELOR OF TECHNOLOGY  
IN  
ELECTRICAL & ELECTRONICS ENGINEERING**

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**DEPARTMENT OF  
ELECTRICAL AND ELECTRONICS ENGINEERING**

**AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**  
(Permanently Affiliated to Jawaharlal Nehru Technological University, Kakinada, AP)

(An NBA/NAAC Accredited Institution)

Tamaram, Narsipatnam, Visakhapatnam-531113

**(2017-2018)**

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## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING



### CERTIFICATE

This is certify that the project report entitled "SOLAR ENERGY BASED HYBRID ELECTRIC CAR MODEL USING MATLAB SIMULINK" is a bonafide work submitted by D PAVAN KUMAR, S RAM PRASAD, A JITENDRA, S SUNEEL KUMAR, G SARATH KUMAR, J SATISH, in partial fulfillment of the requirements for the award of degree of

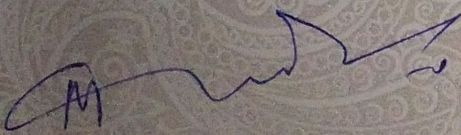
### BACHELOR OF TECHNOLOGY IN ELECTRICAL & ELECTRONICS ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY,

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During the academic year

(2017-2018)

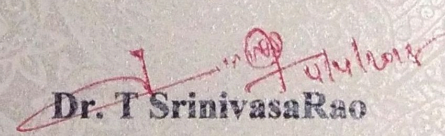
  
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# Abstract

Our project is simulation of Hybrid Electric Car using MATLAB simulink. The hybrid electric car which is driven by a 3 phase induction motor powered by using two power sources is designed. By considering the emission of greenhouse gases from the present day cars & the fuels using are limited, the idea of hybrid vehicles had raised.

By this proposed model, we are making excessive efforts to reduce carbon emission while transport. In present day scenario the world is looking for solar energy as source based electric cars. But solar (Photovoltaic (PV) cells) itself cannot provide sufficient power to the cars for applications of long drive. So, the alternate power source is mandatory. For consideration of economic issues and long drive applications, incorporate battery is used (which is rechargeable by AC source) is integrated. So that the system makes hybrid and more reliable.

The model used for MPPT (maximum power point tracing) controller can be obtained by using P&O (perturbation and observation) algorithm which can be utilised for PV system and battery. The model used for vector control design can be obtained by using the space vector theory. The 3-phase motor quantities are expressed in terms of complex space vectors. Such a model is valid for any instantaneous variations of voltage and current and adequately describes the performance of the machine under both steady state and transient operation. Complex space vectors can be described using only the orthogonal axes. So, the motor can be considered a 2-phase machine. In, the case of induction machines, the control is usually performed in the reference frame (d-q) attached to the rotor flux space vector. We implemented vector controller to run 3 phase induction motor as separately excited dc motor since their superior speed torque characteristics.

In this model, the complete system is simulated and explored the performance of the system. The simulation results are presented based on MATLAB simulink.