

## Energy Management in Current Fed Switched Inverter Based Propulsion Motor for Marine Application

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### ABSTRACT

In this paper the super capacitor and battery based current fed switched converter produce high voltage gain and the performance of motor is improved. The fuel based renewable energy produce the less dynamic performance of the motor and life time is reduced so the proposed paper use the super capacitor based energy production. The permanent magnet synchronous based motor has high performance. The permanent magnet synchronous motor vector control strategy is adopted. The proposed method the inverter and motor are interconnected. The motor functioning is used in the marine based electric device. The proposed method use the space vector control method is used. The possibility of the system and the control methods are established by MATLAB/ simulink environment.

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## 1. INTRODUCTION

The battery supply the power to the CFSI and produce the high gain with less ripple compared to the conventional fuel based motor performance is explained [1]-[4]. The Permanent magnet synchronous motor has high efficiency, high torque density, and mostly used in the electric drive application. The proposed paper use the space vector control for improves the stability and regulate the performance of motor [5].

## 2. BACKGROUND

The super capacitor can be represented by high current charging and releasing, long cycle life, high recovery energy incorporation effectiveness, particularly the quick charging and releasing, which can make up the drawbacks of energy component and the power supply framework. This paper utilizes this power supply for correlative is presented in the [6]. So far the energy administration innovation of electric vehicle is for the most part in light of the management technique of space vector based control is explained in these review [7],[8].

## 3. THE PROBLEM

In conventional inverter based system has two converter circuit. one for boosting purpose and another for inverting purpose. But in proposed current fed switched inverter has single stage power conversion and also improve the efficiency of the system drive system.

**4. PROPOSED SOLUTION**

An EMS, which can permit to controls the energy flow to the super capacitors, in an approach to expand the self-sufficiency of the batteries. The appraised voltage of the super capacitors may not achieve the required voltage level of the DC link, being required a current fed switched inverter which fills in as a stage up/down transformer to get the desired estimation of the yield voltage. The block diagram of proposed method is shown in Figure 1. The distributed system is explained in the Impact of distributed generation on distribution systems and its protection [9].

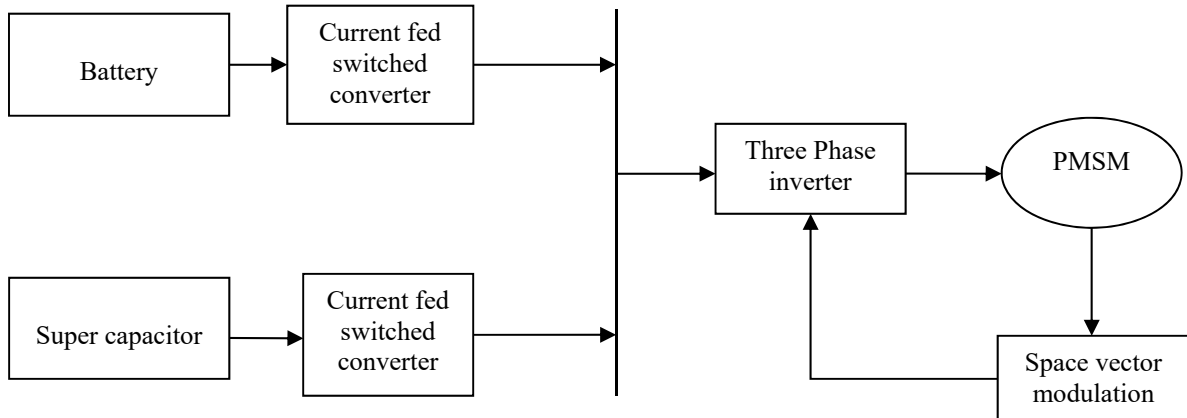


Figure 1. Block Diagram of Proposed Method

The super capacitor supplies the bus and absorbs the braking energy. So it is necessary to use the current fed switched converter. After the DC bus gets sufficient power supply, it is not complicated to drive the permanent magnet synchronous motor run at required torque and speed. The power utilization is explained in the power optimization using firefly algorithm [10].

Current fed switched inverter has same gain as that of ZSI and same part considers that of SBI. It is having the ability to deliver high gain and it is a single stage inverter. Buck and step up operations are conceivable with CFSI. High step up operation is conceivable without working at extraordinary obligation proportion [11]-[12]. CFSI draws ceaseless info current from the dc source which makes it appropriate for the inexhaustible applications. In any case, the disadvantage of CFSI is the confinement in the estimation of its modulation index  $M$  [13]. the current fed switched inverter is shown in Figure 2.

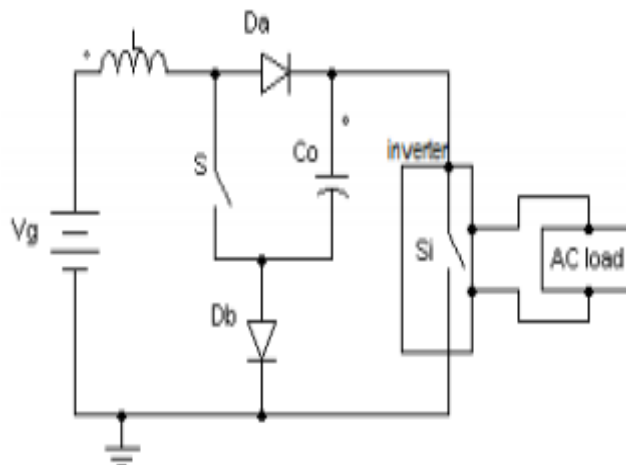


Figure 2. Current fed switched inverter

The PMSM vector control strategy is approved, which recognize the space vector control. This strategy is mostly used, and is inappropriate for EV.

Table 1. Parameters of PMSM

S. No	Parameters	Value
1	inductance of q-axis	8.5mH
2	inductance of d-axis	4.5mH
3	Rated speed	2000 r/min
4	Rated torque	6.5N·m
5	Rated current	6.8A
6	Pole number	3

## 5. SIMULATION AND RESULTS

The super capacitor and battery based PMSM is used in electric vehicle application. The dc link voltage of the current fed switched inverter is shown in Figure 3. The stator voltage and current is shown in Figure 4. The performance characteristics of PMSM are shown in Figure 5.

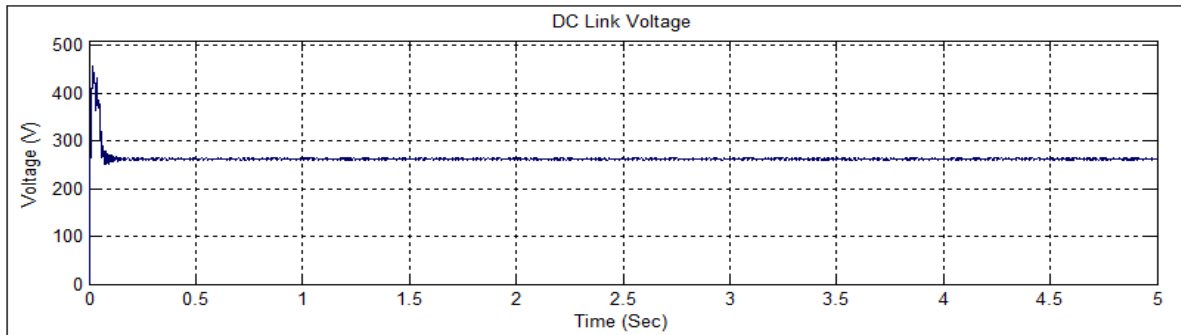


Figure 3. DC link Voltage of Current Fed Switched Inverter

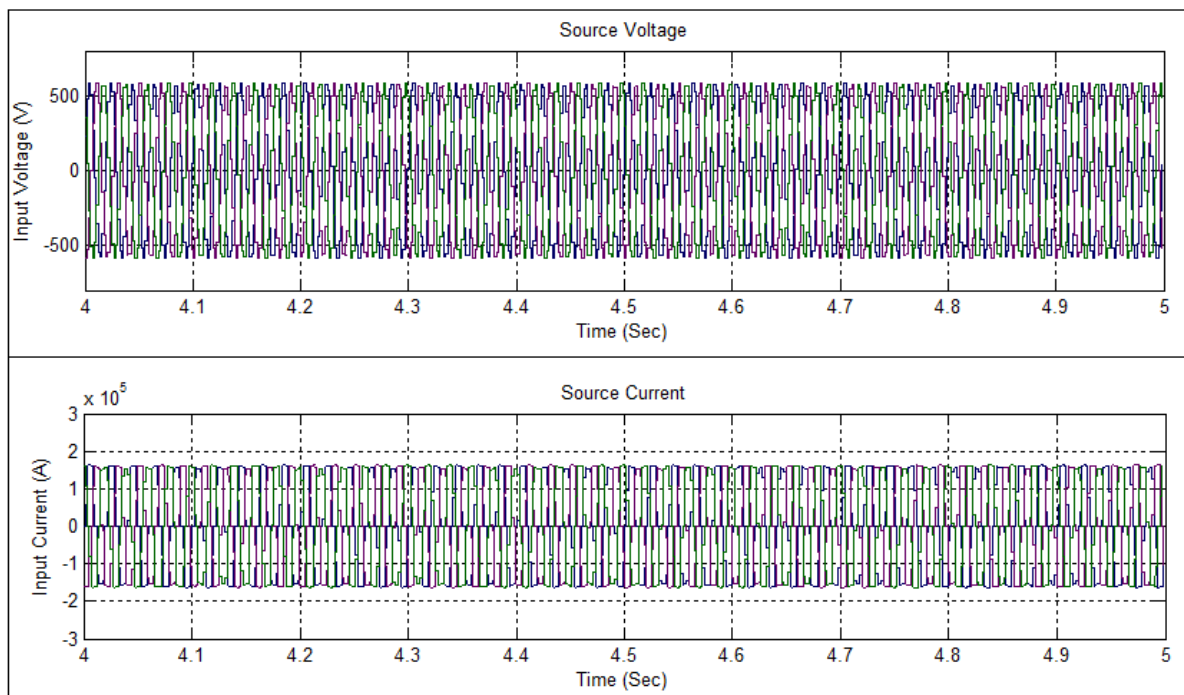


Figure 4. Stator Voltage and Current Waveform

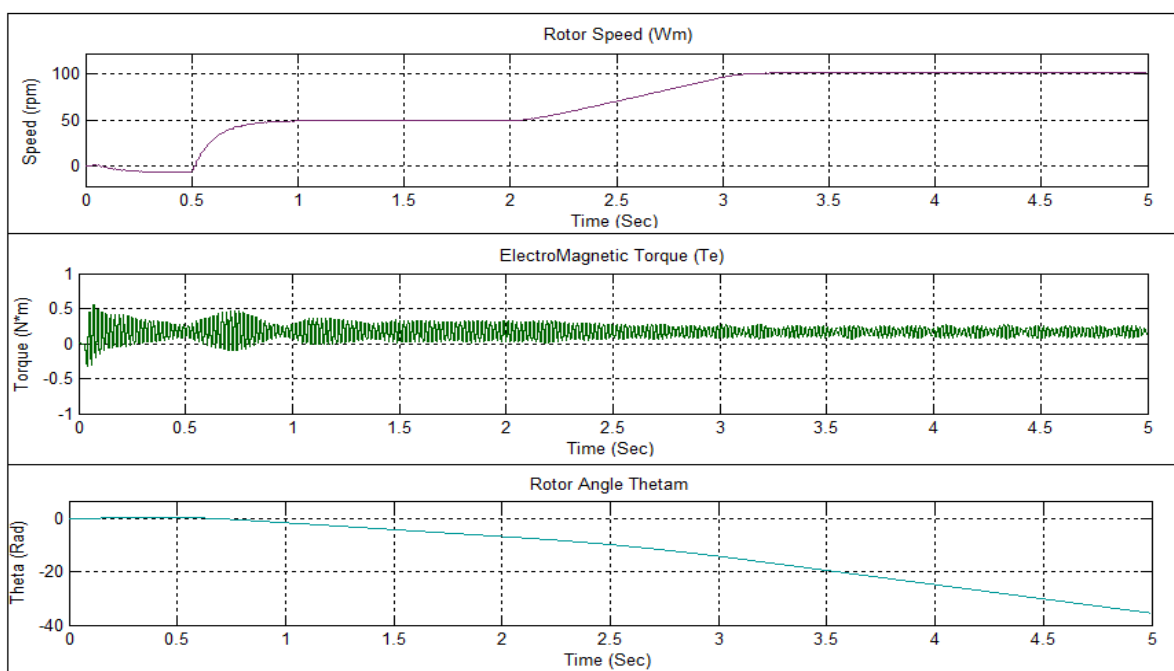


Figure 5. Performance of PMSM

## 6. CONCLUSION

In this paper the battery based current fed switched inverter for electric application. The performance of PMSM based inverter is obtained by simulation. The dc link voltage is maintained by using the super capacitor.. In the beginning process of the engine, the energy unit enters the working state step by step, and the super capacitor discharges a substantial current which makes the engine get enough power. Engines can be provided with satisfactory power supply in the entire procedure of engine driving and have the security and velocity in the meantime.

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