# SNS College of Technology, Coimbatore-35

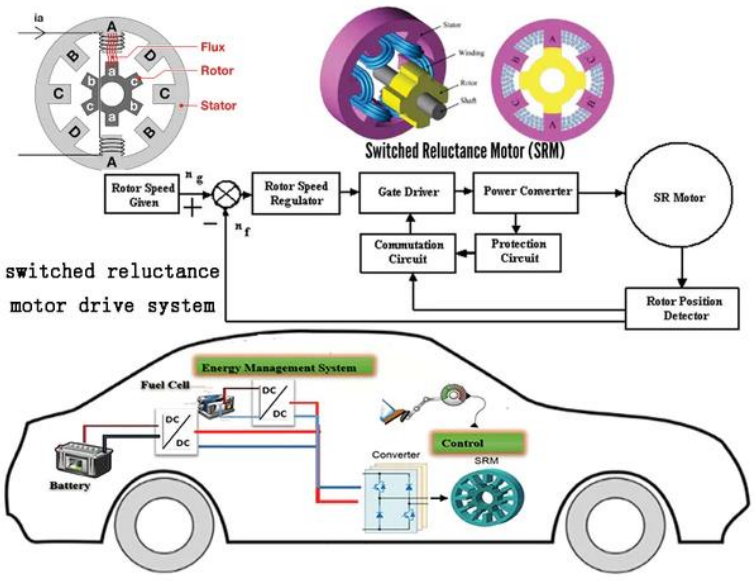
## 19MEE402 Hybrid Technology

## UNIT 4- ELECTRIC VEHICLE MOTORS

### Switched Reluctance Motor Drives

Switched Reluctance Motors (SRMs) have been considered as an alternative to traditional motor technologies in electric vehicles (EVs). SRMs have certain characteristics that make them attractive for certain applications, but they also come with challenges. Here's an overview of SRM drives in electric vehicles

Switched reluctance motor is considered to be a very suitable motor drive system for electric vehicles because of its simple and reliable structure, low manufacturing cost, reliable converter and good torque-speed characteristics. The switched reluctance motor has no permanent magnets or windings on the rotor, which not only reduces the cost of the motor, but also allows for high-speed operation. The commonly used half-bridge inverter topology for switched reluctance motor drive systems is shown in Figure 1.




The stator winding is connected in series with the upper and lower switches of each bridge arm of the inverter to prevent shoot-through short-circuit faults. The resulting problem is that each phase There are two heads, the length of the power line required and the difficulty of connection increase,

which is different from the inverter for induction motor and permanent magnet synchronous motor drive. In addition, high efficiency over a wide range and simple control are significant advantages of switched reluctance motor drives.

**Advantages:**

1. **Simple Construction:** SRMs have a simpler structure compared to other motor types like permanent magnet motors. They have fewer parts, leading to lower manufacturing costs.
2. **High Torque Density:** SRMs can achieve high torque density, making them suitable for applications where a high torque is required in a compact space.
3. **Robustness:** SRMs are known for their robustness, as they lack permanent magnets that can be sensitive to high temperatures and demagnetization.
4. **Fault Tolerance:** SRMs can operate with certain degrees of phase and circuit faults, making them potentially more fault-tolerant compared to some other motor types.

**Challenges:**

1. **Complex Control:** The control of SRMs can be more challenging than that of other motor types. Advanced control algorithms are often needed to optimize performance.
2. **Acoustic Noise and Vibration:** SRMs can produce more acoustic noise and vibration during operation compared to other motor types, which can be a concern in applications like electric vehicles where a quiet operation is desirable.
3. **Efficiency at Partial Load:** SRMs may exhibit lower efficiency at partial load conditions compared to other motor types, which could impact the overall efficiency of the electric vehicle.
4. **Limited Commercial Availability:** As of my last knowledge update in January 2022, SRM technology was not as widely adopted as other motor technologies in the electric vehicle industry. Availability of SRM components and expertise may be more limited.

**Applications:**

SRMs might find specific applications in electric vehicles where their advantages outweigh their challenges. For instance, they could be used in specific driving conditions or in conjunction with other motor types to optimize efficiency.

It's important to note that advancements in technology may have occurred since my last update, so it's recommended to check the latest research and industry developments for the most current information on switched reluctance motor drives in electric vehicles.