

ECEN 338

Dr. Haithem Abu-Rub

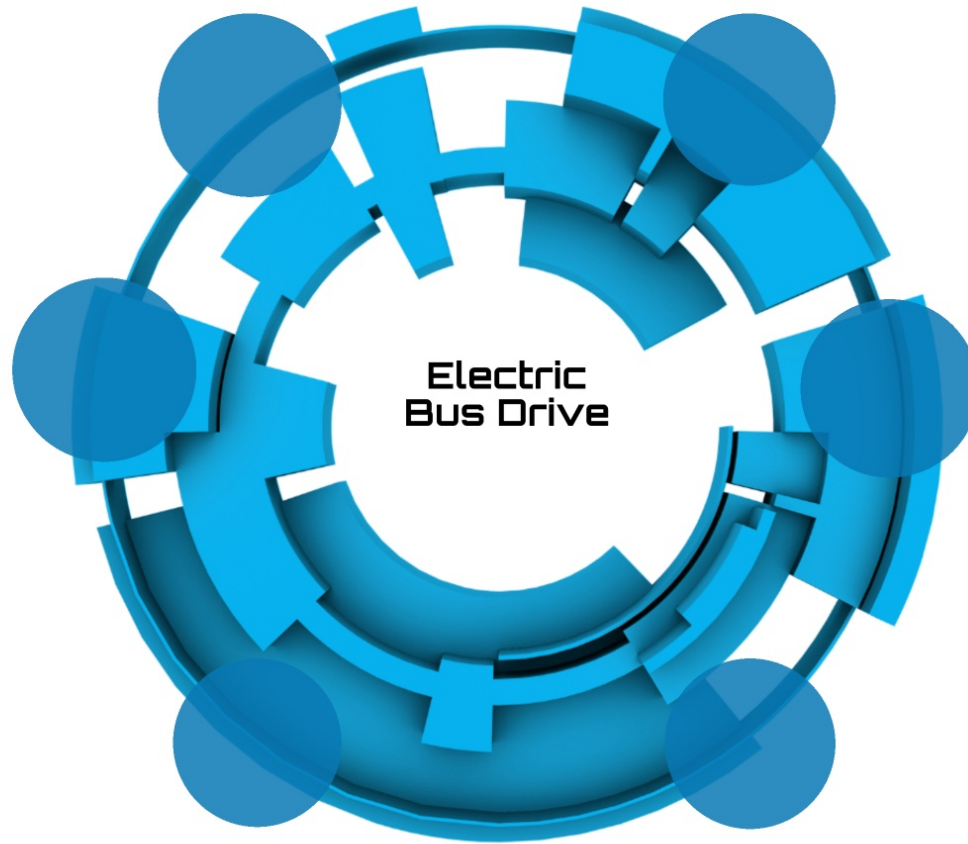
Dana Badar
Hayfa Al-Kuwari
Sara Al Hamad

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- AC Motor Drive
- Battery
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- Advantages & Disadvantages Induction of Electric Vehicles.
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- Conclusion

Introduction





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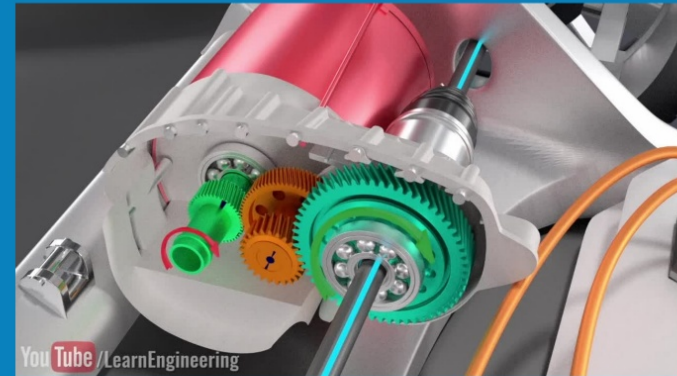
Induction Motor Drive

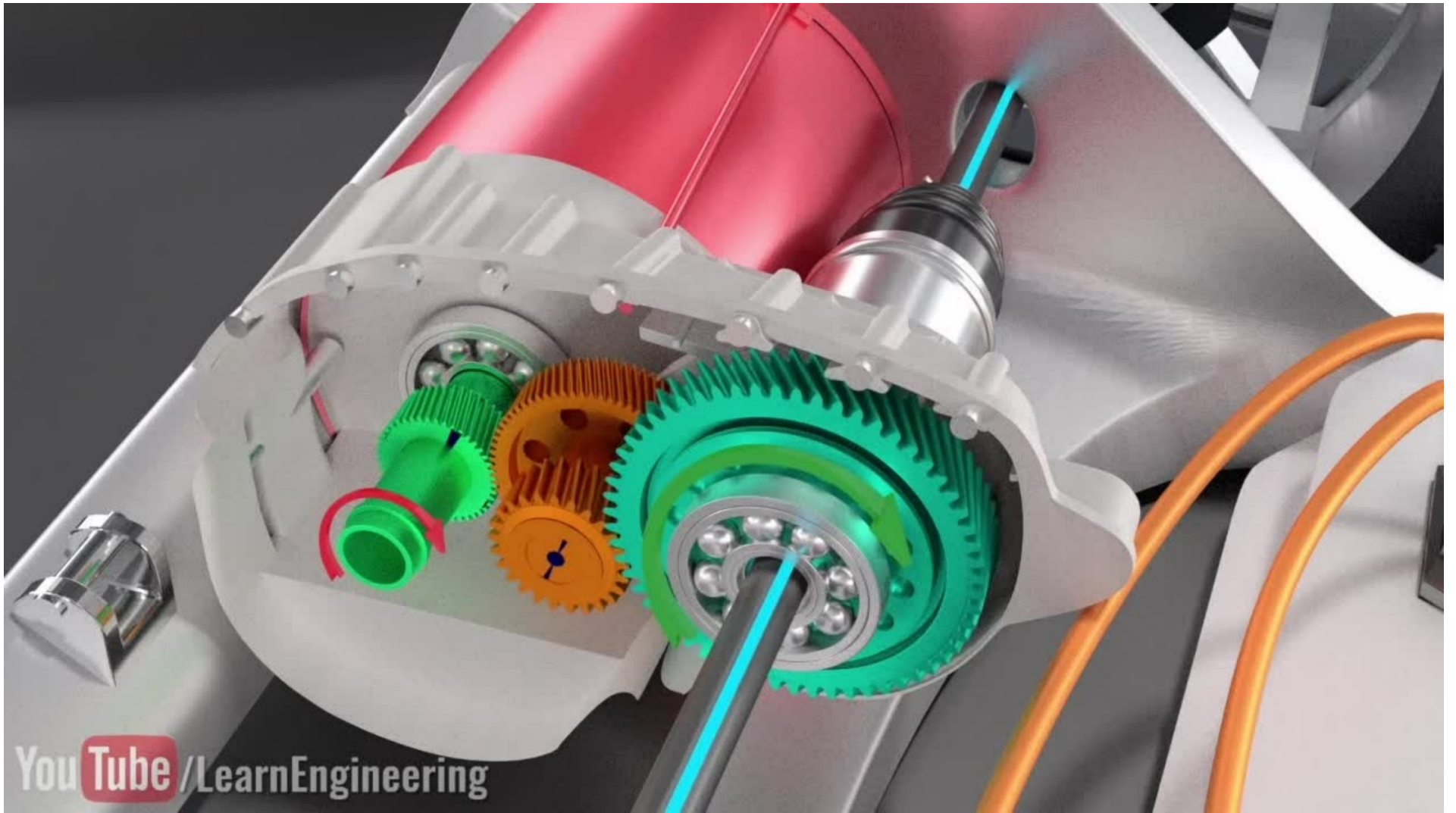
Theoretical

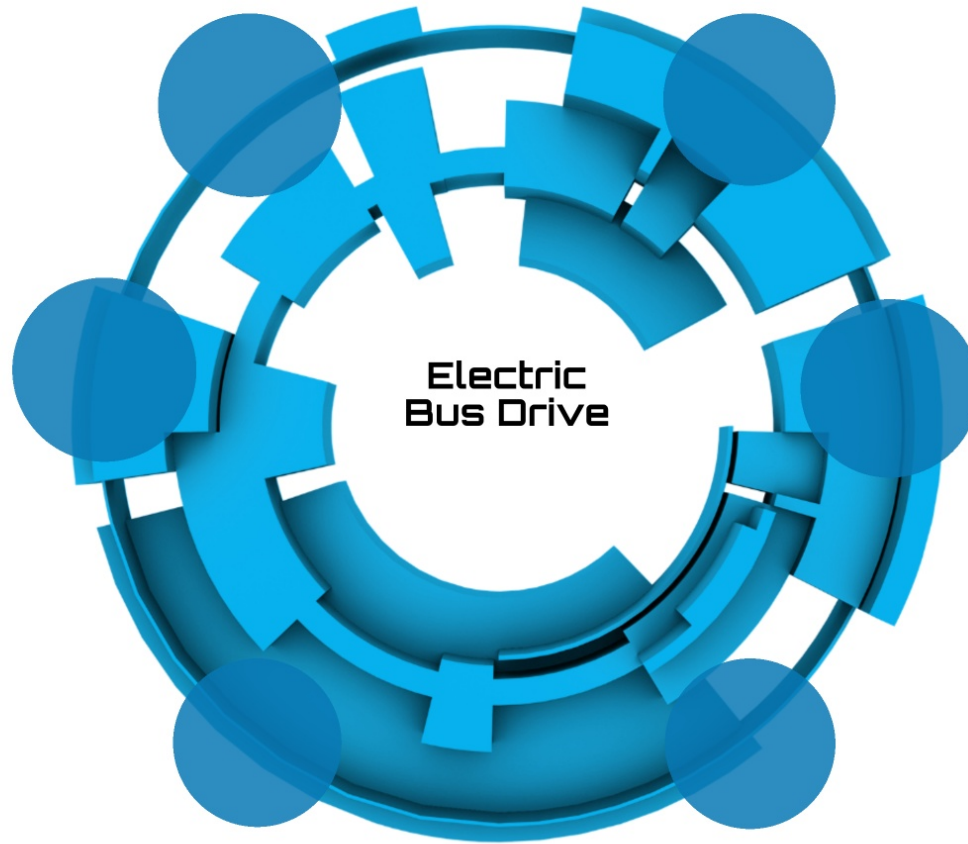
- What is induction motor
- Working Principle
- Braking of Induction motor

Technical

- Power input
- The Induction Motor
- Gearbox







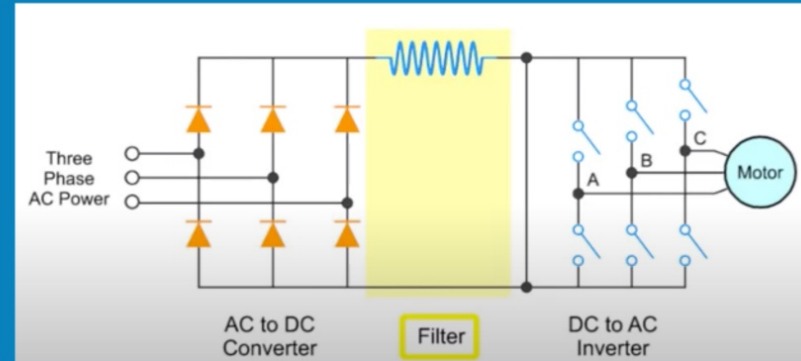
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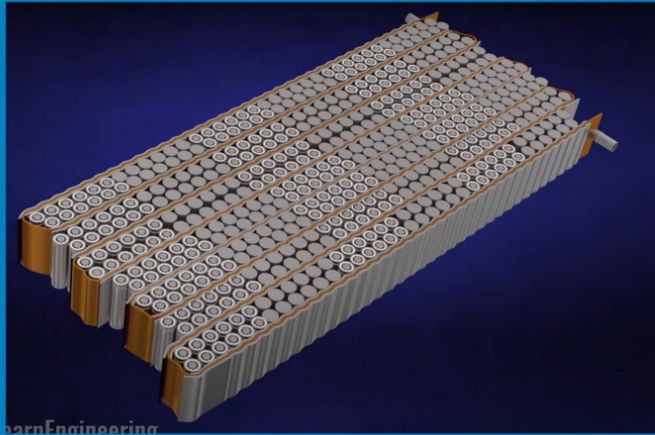
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AC Motor Drive

- What is AC Motor Drive or VFD
- Working Principle
- Induction Motor Characteristics under VFD



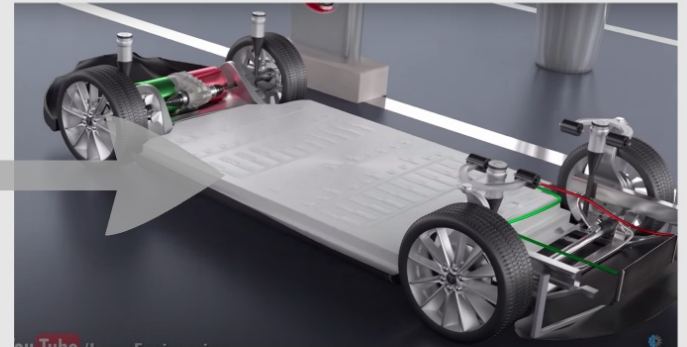
Battery



LearnEngineering

Cells

Battery

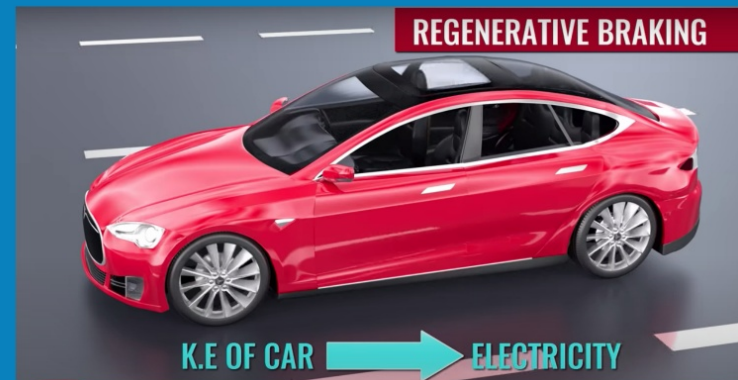


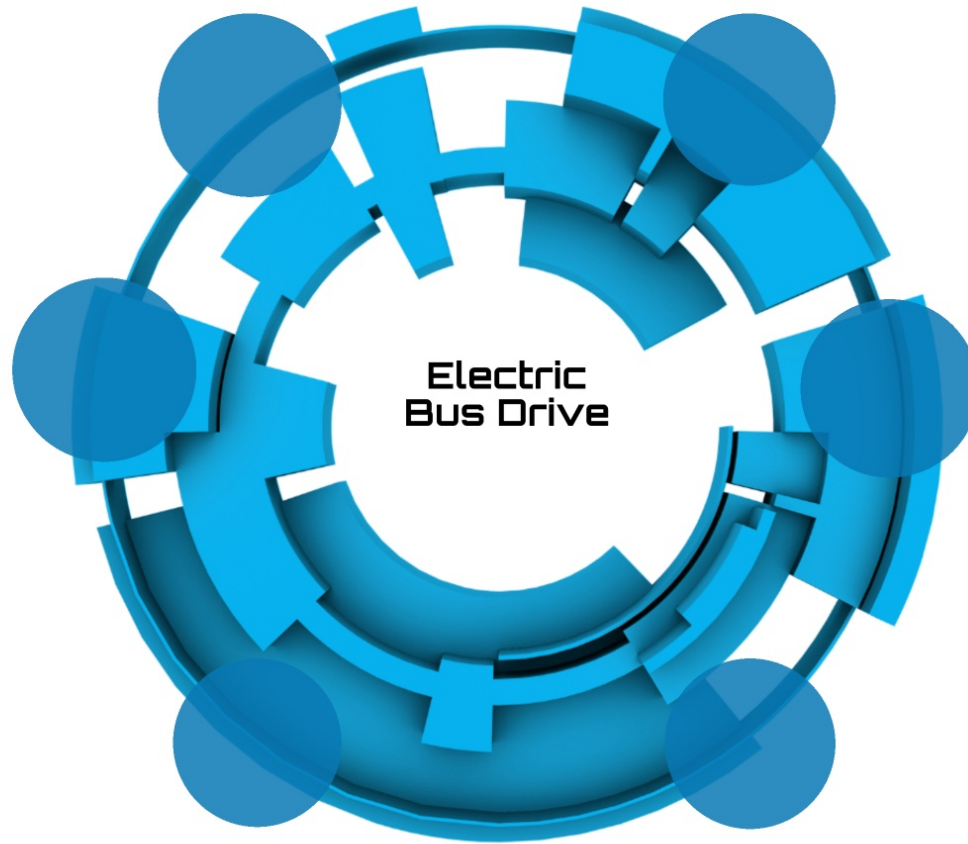
Generator

Theoretical

$$P_{conv} = \tau_{ind} * \omega$$

Technical





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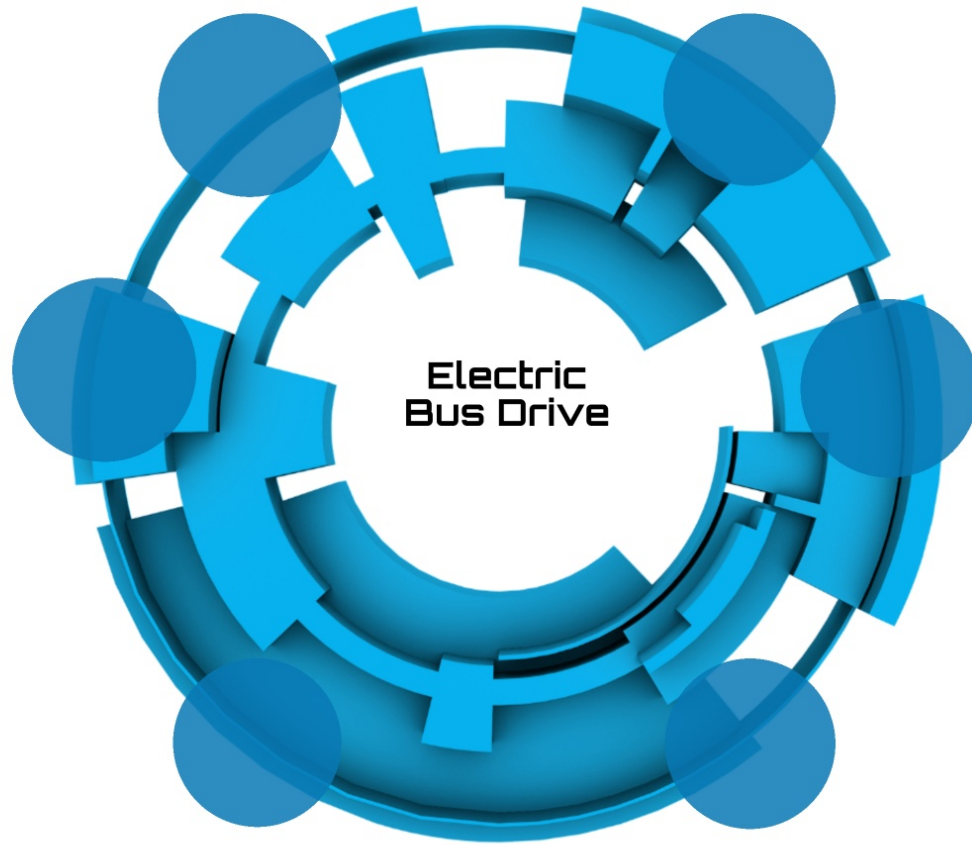
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Advantages and Disadvantages of induction motor

- High Performance Vehicle
- High Response
- No Noise
- No pollution at Vehicle level
- Lower Maintenance and driving cost
- High Safety
- Single Speed Transmission
- High Torque and Power
- Effective Traction Control

- 
- Long Range
 - High Cost
 - Long Charging Time

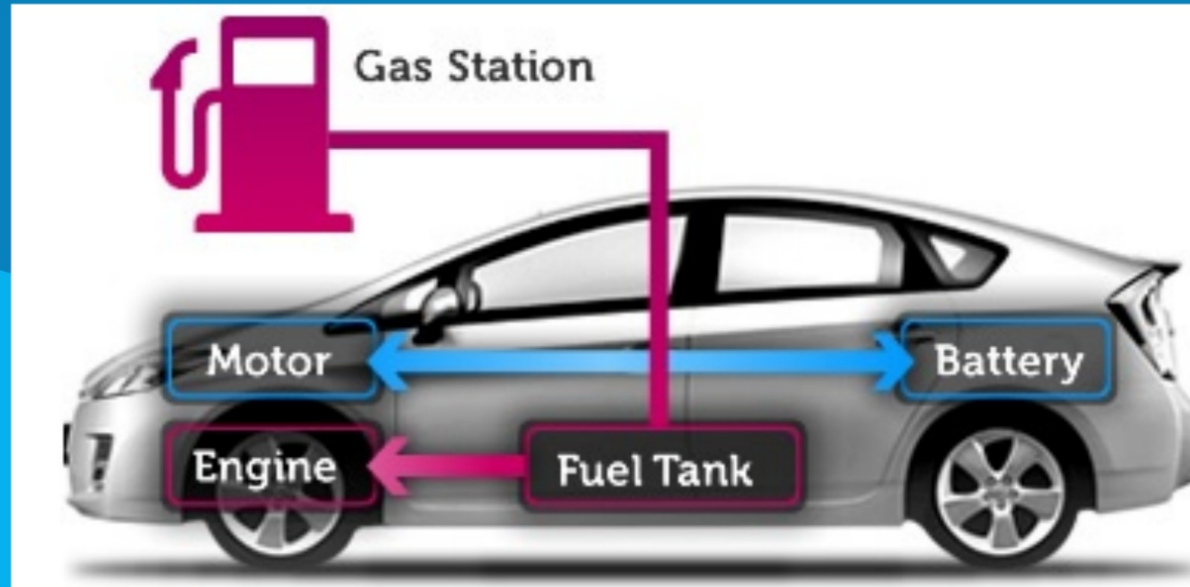


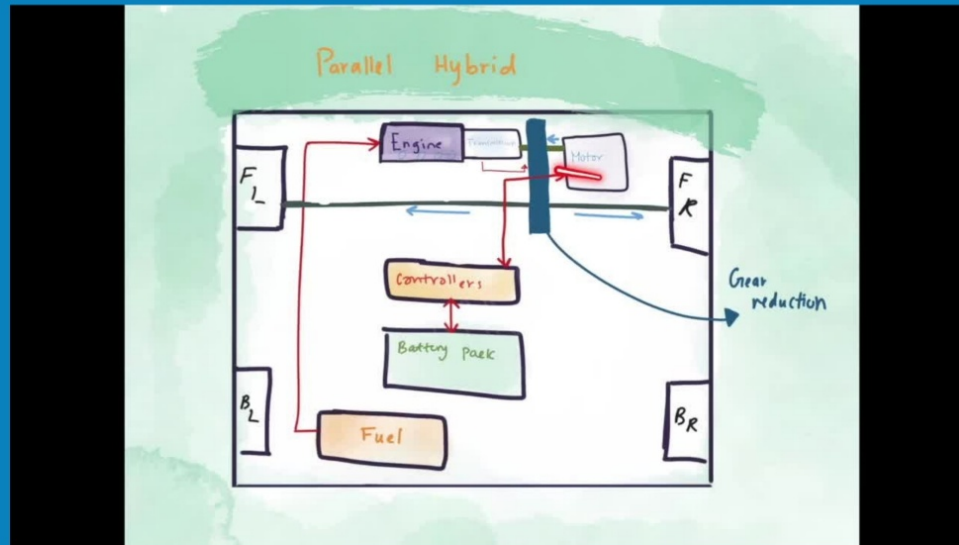
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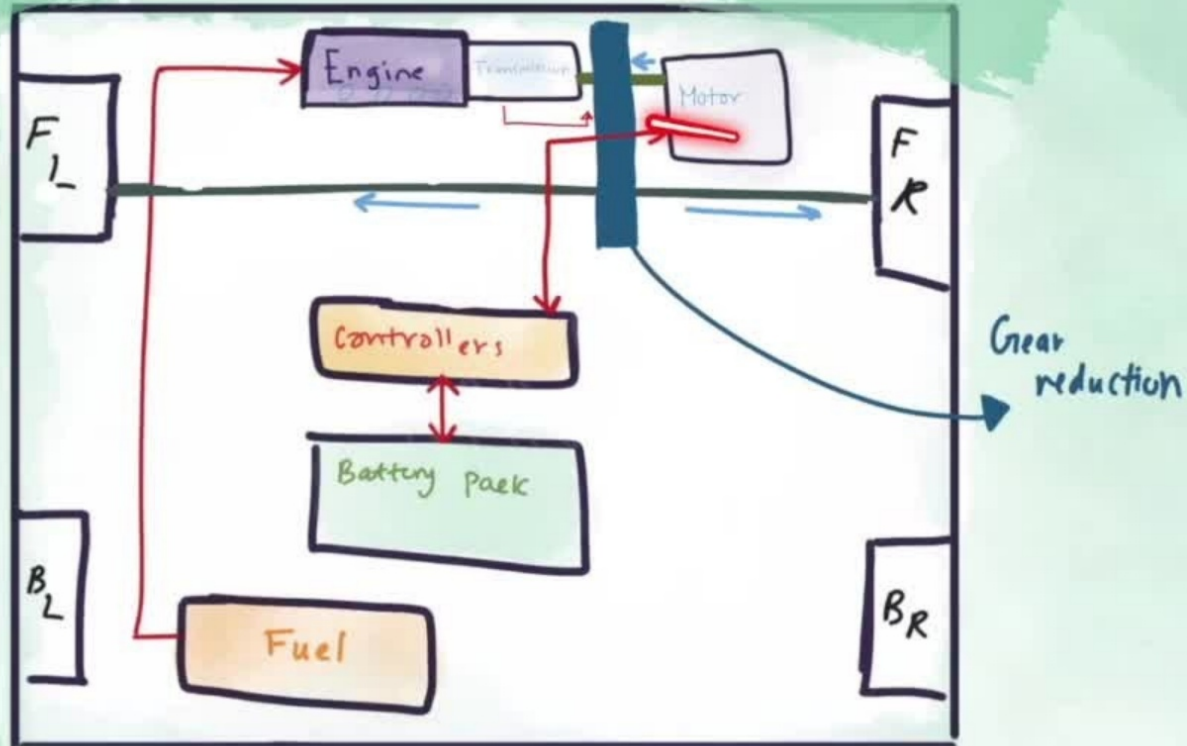
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Hybrid Bus

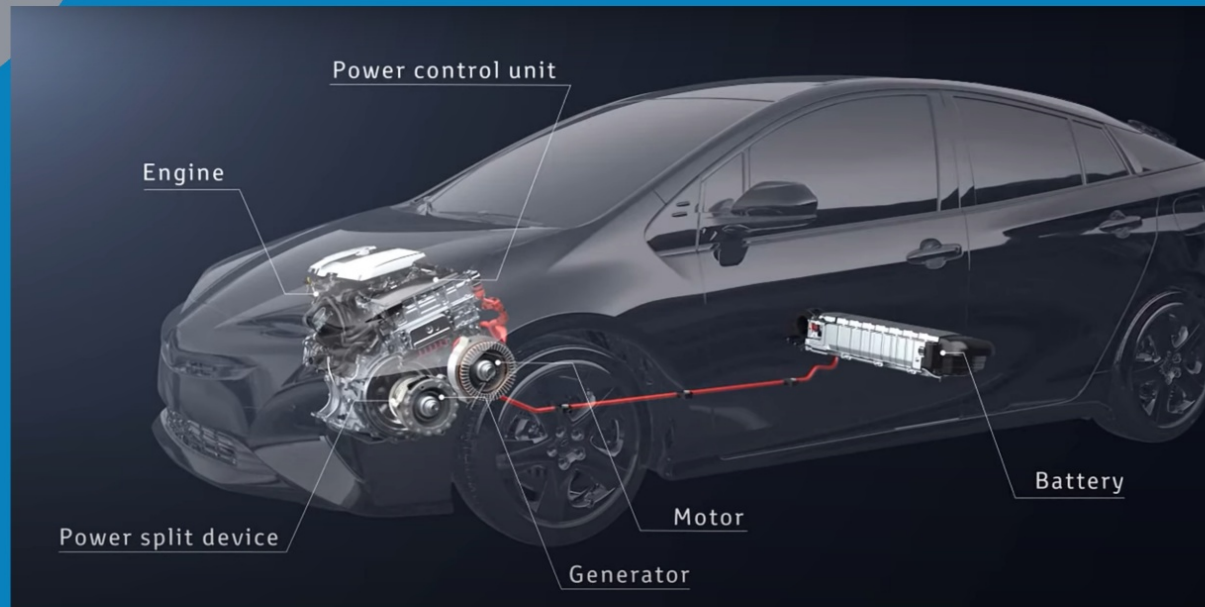




Parallel Hybrid



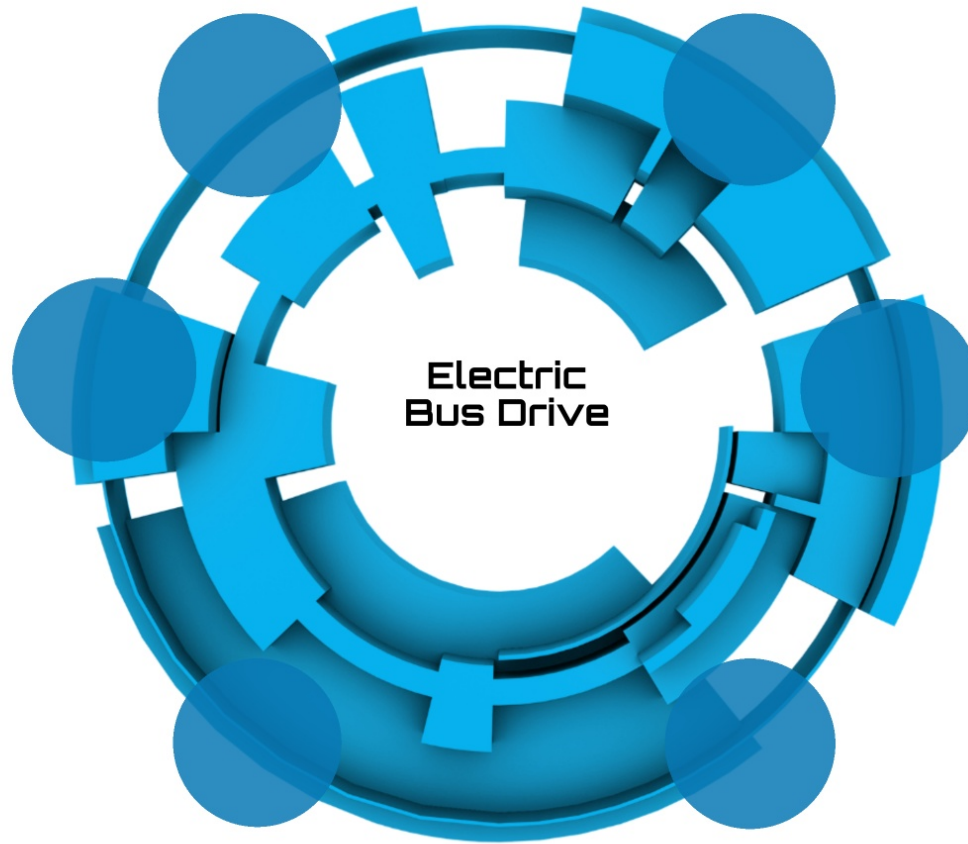
Technical



Advantages & Disadvantages

- Low Emission
- High Efficiency
- Engine Starting
- Environmental Friendly
- Regenerative Braking System

- Expensive
- Maintenance
- Less Speed



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Conclusion

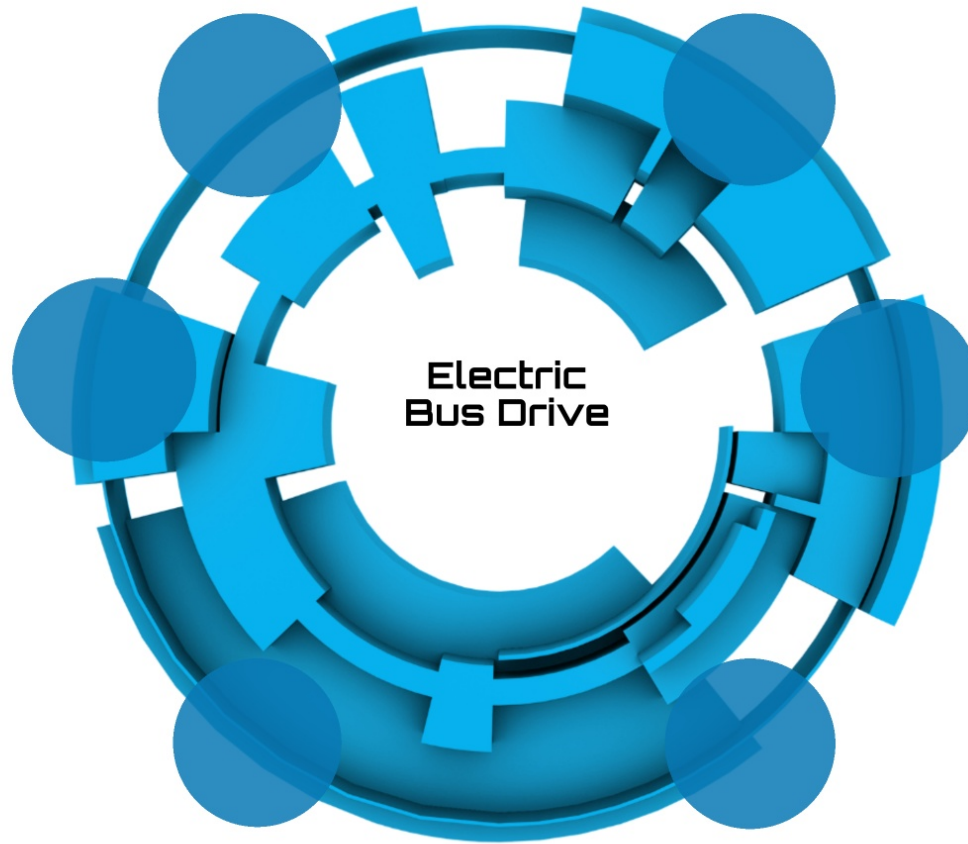


References

- [1] C. Andersson, "Observations on Electric Hybrid Bus Design [Online]. Available:<https://www.iea.lth.se/publications/Theses/LTH-IEA-1026.pdf> [Accessed: 17-Apr-2020].
- [2] "DC Motor Drives ," Electrical4U, 30-Jul-2018. [Online]. Available: <https://www.electrical4u.com/dc-motor-drives/>. [Accessed: 17-Apr-2020].
- [3] Electrical4U, "Induction Motor Drives: Starting Braking Speed Control of Induction Motor," Electrical4U, 08-Jun-2019. [Online]. Available: <https://www.electrical4u.com/induction-motor-drives-starting-braking-speed-control-of-induction-motor/>. [Accessed: 18-Apr-2020].
- [4] Electrical4U, "Variable Frequency Drive or VFD," Electrical4U, 17-Dec-2019. [Online]. Available: <https://www.electrical4u.com/variable-freque>. [Accessed: 17-Apr-2020].
- [5] Learn Engineering, How does an Electric Car work ? Tesla Model S, May. 30, 2017. Accessed on: April. 6 , 2020. [Video file]. Available: <https://www.youtube.com/watch?v=3SaxXUIre28>
- [6] Mehrdad .E, Yimin .G, Stefano .L, Kambiz .E, Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, Third Edition, xth ed. City of Publisher, : Apple Hill, 2018, pp. 273. 300
- [7] Nageshnags, B. Sharma, and Js Gill, "Induction Motor: Working Principle, Types, & Definition," Electrical4U, 03-Nov-2019. [Online]. Available: <https://www.electrical4u.com/induction-motor-types-of-induction-motor/>. [Accessed: 18-Apr-2020].
- [8]Thai doan Tran, Toyota Hybrid System, sep. 25, 2016. Accessed on: April. 6 , 2020. [Video file]. Available: <https://www.youtube.com/watch?v=jNuixuVhc5E>
- [9] Z. Živanović, "The Application of Electric Drive Technologies in City Buses" [Online].https://cdn.intechopen.com/pdfs/41487/InTech-The_application_of_electric_drive_technologies_in_city_buses.pdf [Accessed: 17-Apr-2020].



Any Questions?



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