SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

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DEPARTMENT OF AUTOMOBILE ENGINEERING

AUTOMOTIVE SAFETY & INFOTRONICS

UNIT 3 – SAFETY EQUIPMENTS AND COMFORT SYSTEM

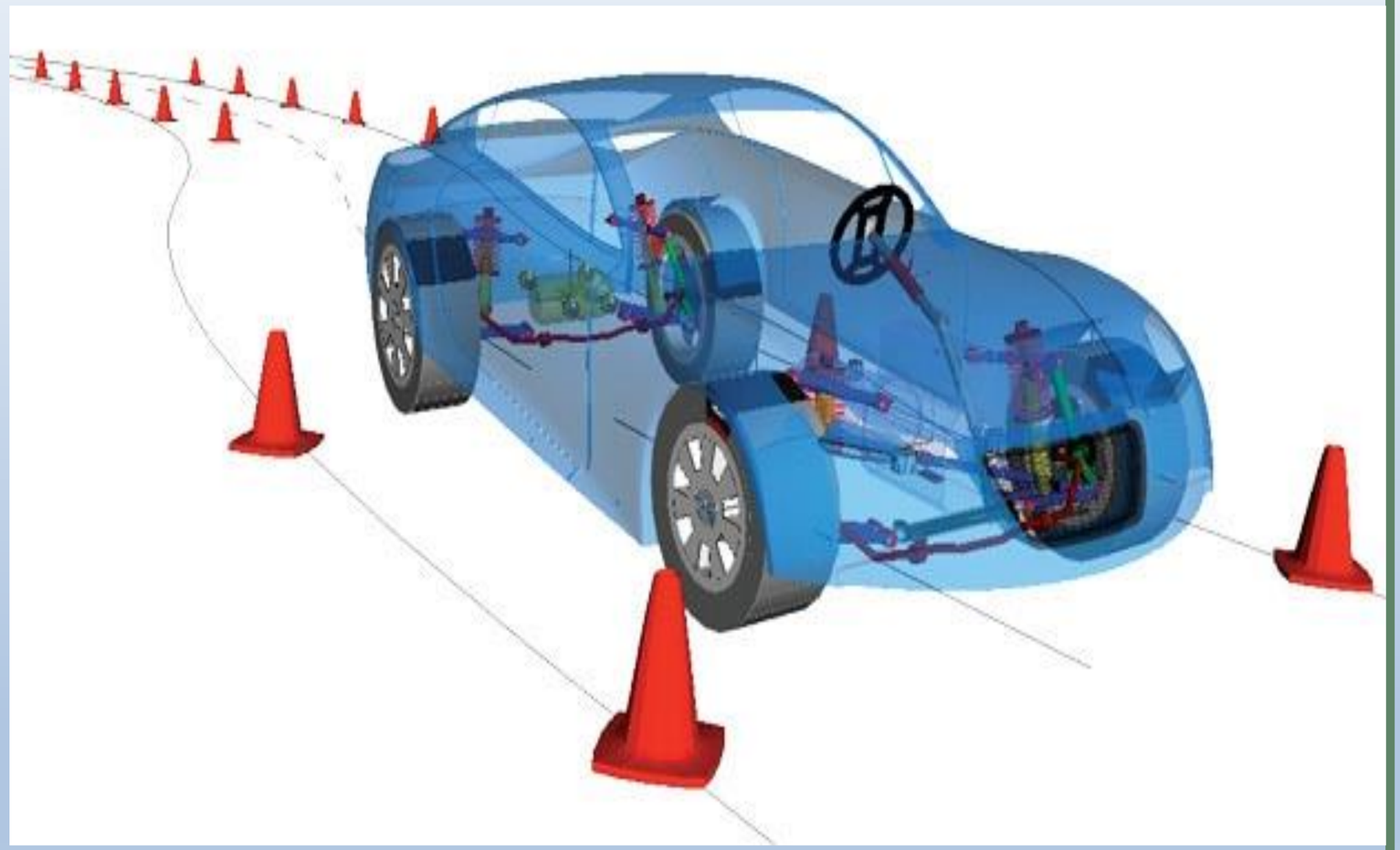
TOPIC 13: ACTIVE SUSPENSION SYSTEM

PRESENTATION OUTLINE

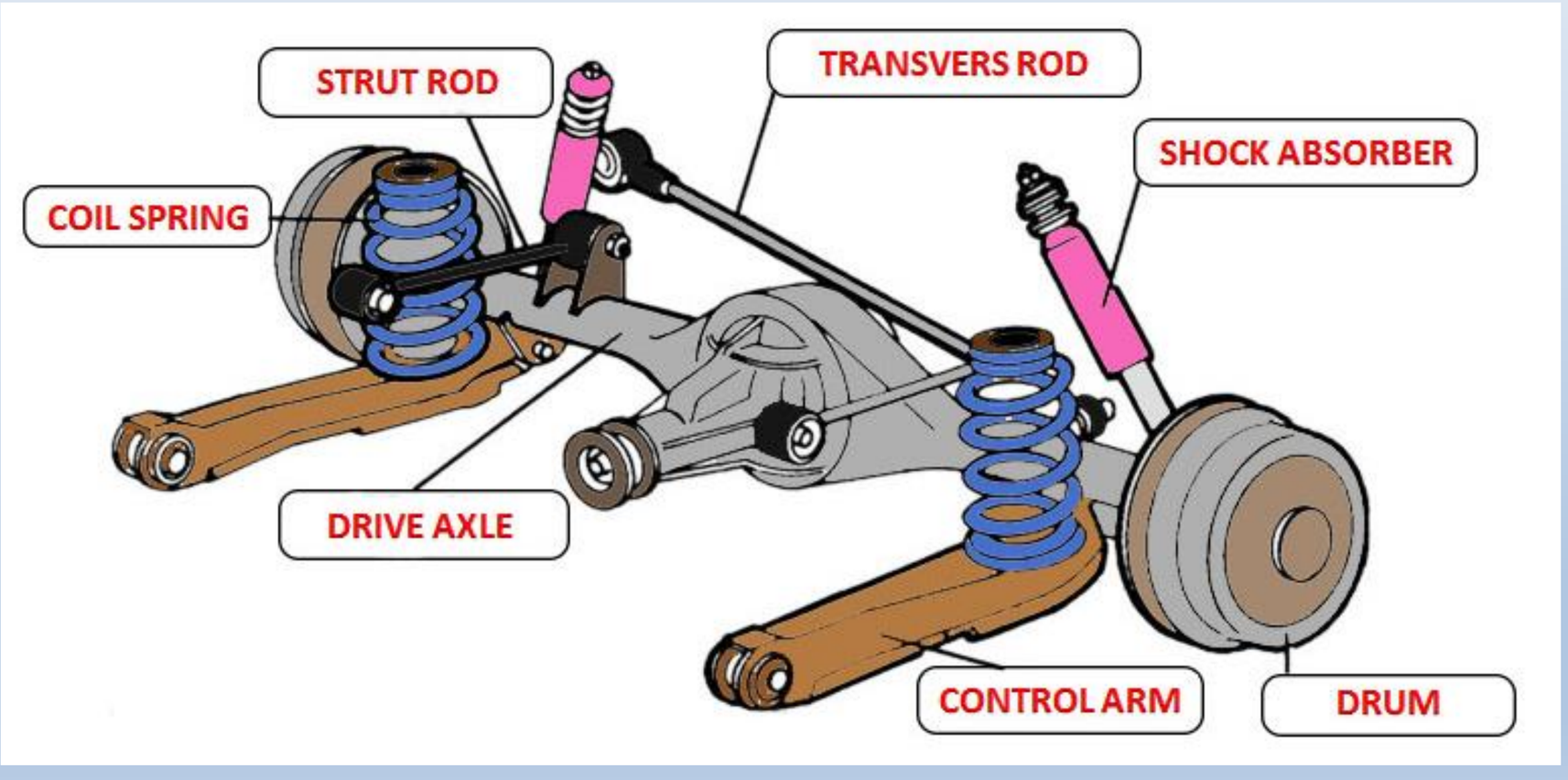
- Vehicle Dynamics
- Introduction
- Parameters
- Components
- Drawbacks
- Sensors

VEHICLE DYNAMICS

- Longitudinal Dynamics
  - Braking
  - Acceleration
- Vertical Dynamics
  - Ride Comfort
- Lateral Dynamics
  - Stability
  - Handling



VEHICLE DYNAMICS



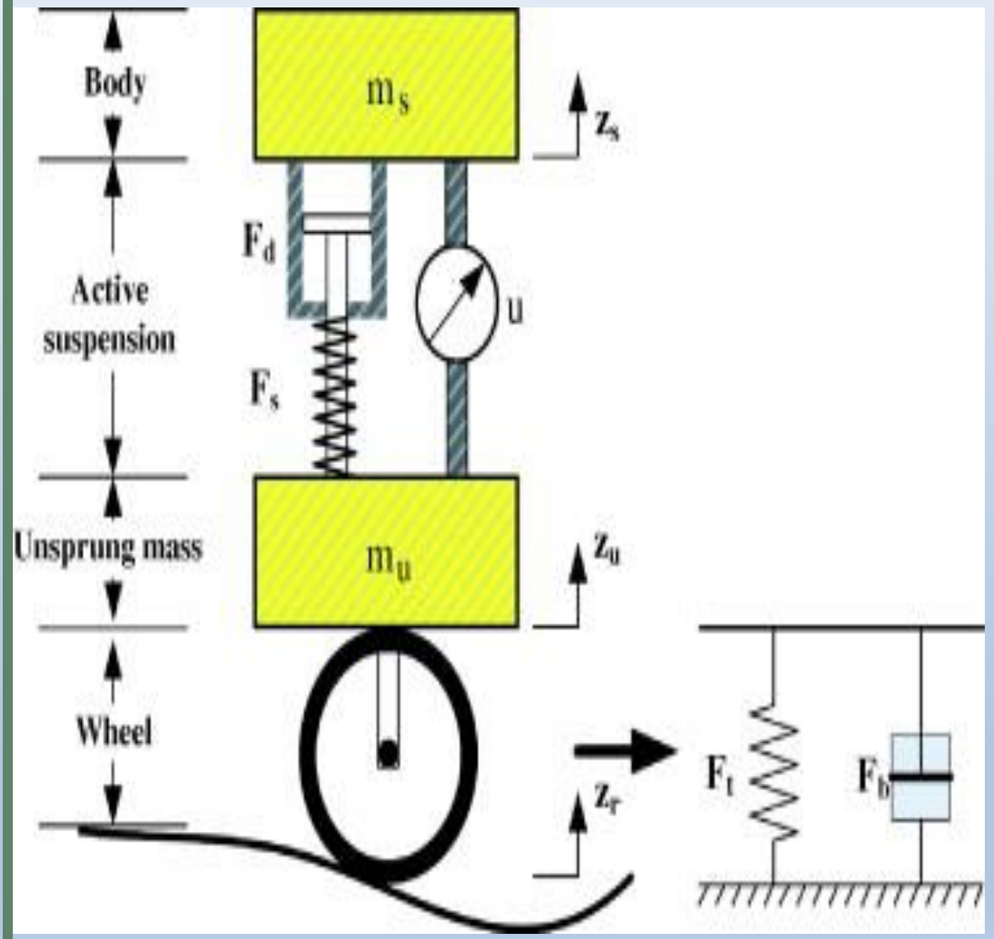
- Suspension Design

  Ride Comfort

  Road Holding

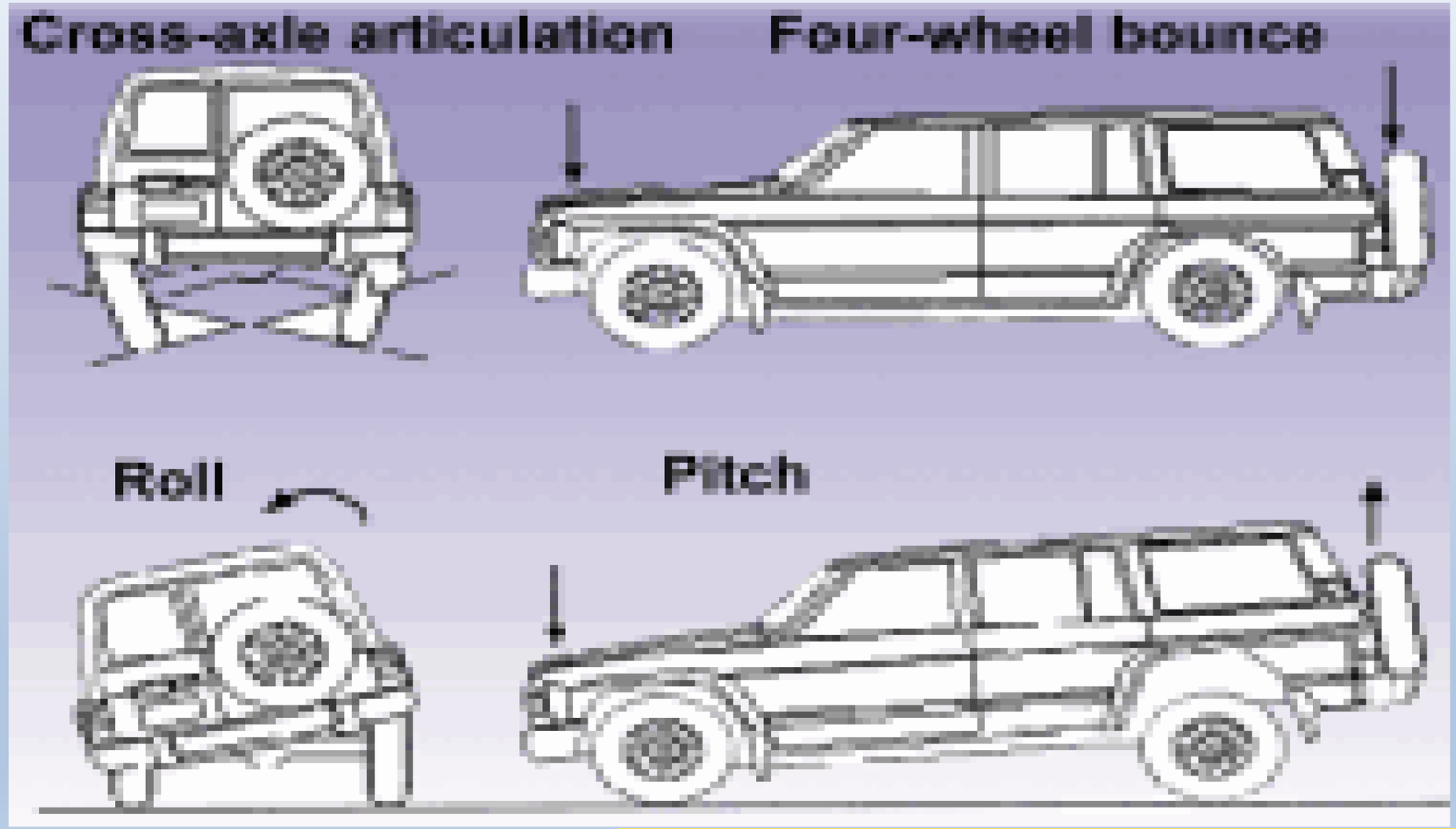
  Handling

INTRODUCTION

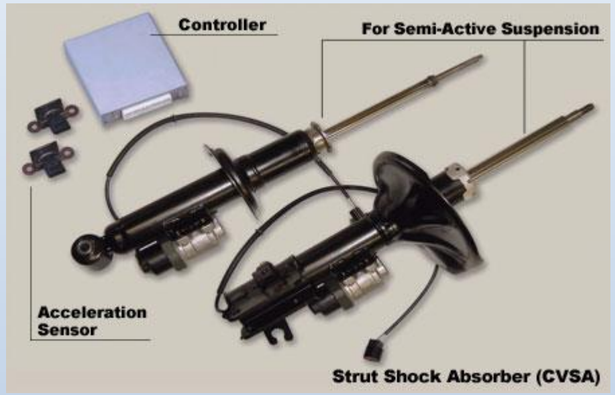


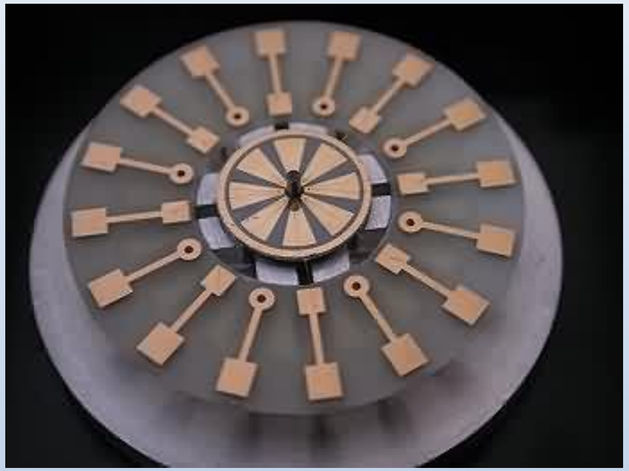
- An active suspension is a type of automotive suspension on a vehicle
- It uses an onboard system to control the vertical movement of the vehicle's wheels relative to the chassis or vehicle body rather than the passive suspension provided by large springs where the movement is determined entirely by the road surface

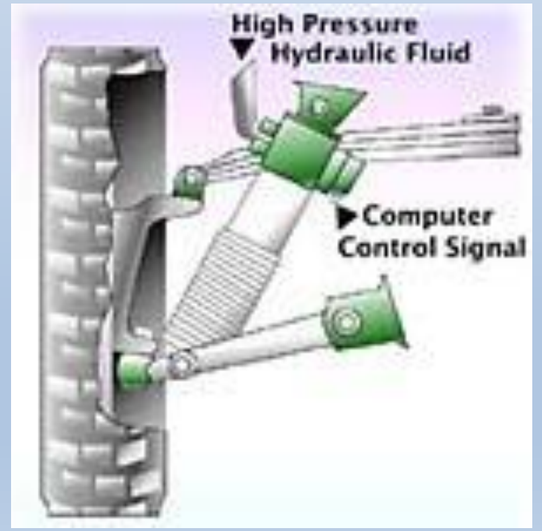
PARAMETERS

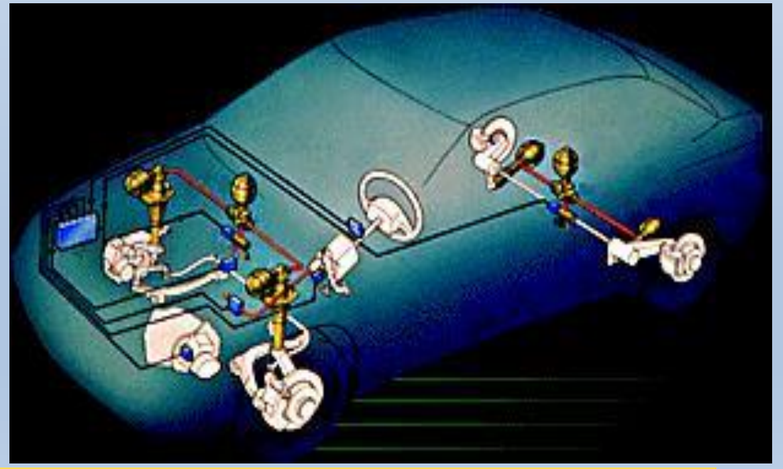


COMPONETS



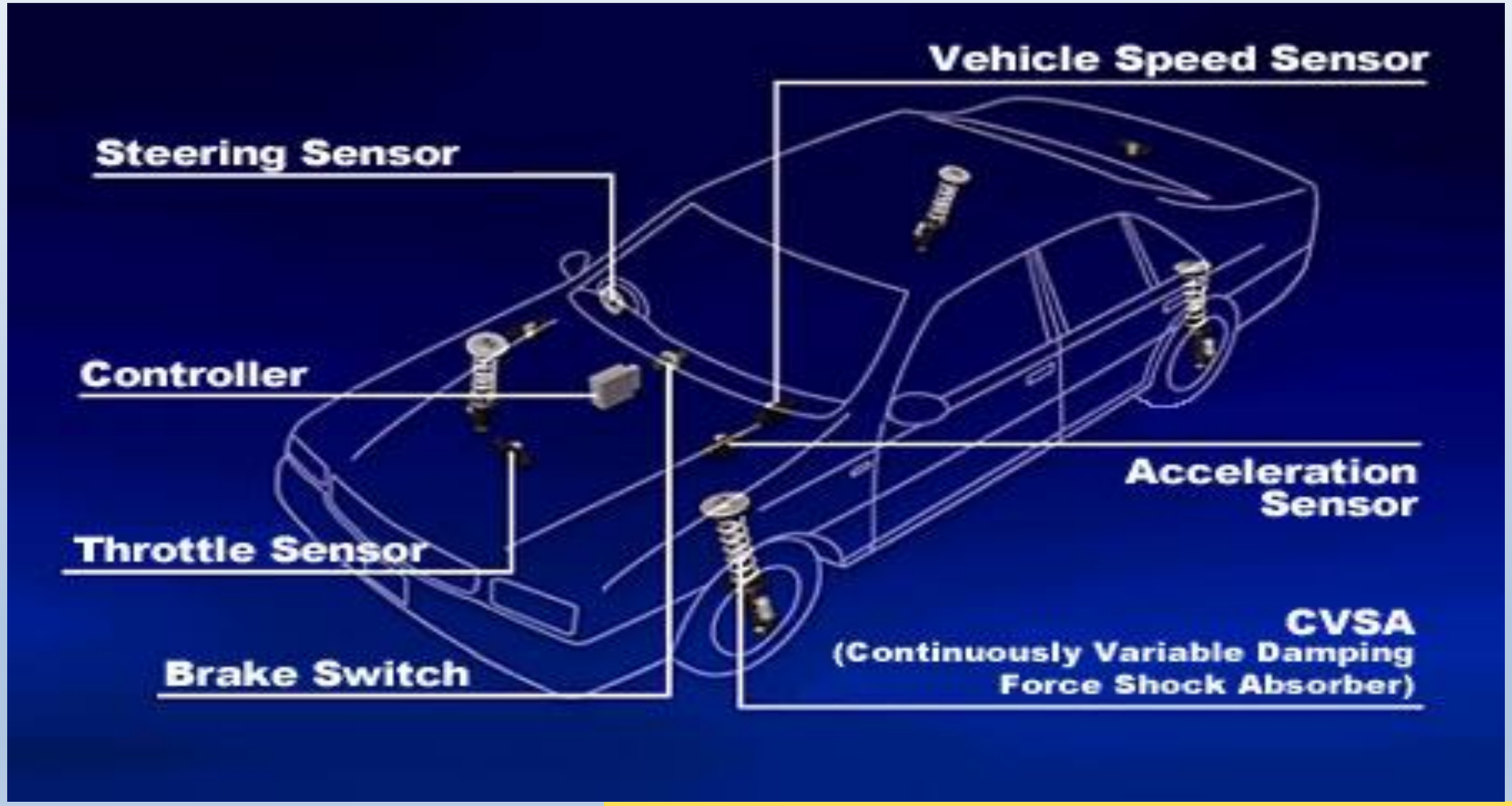




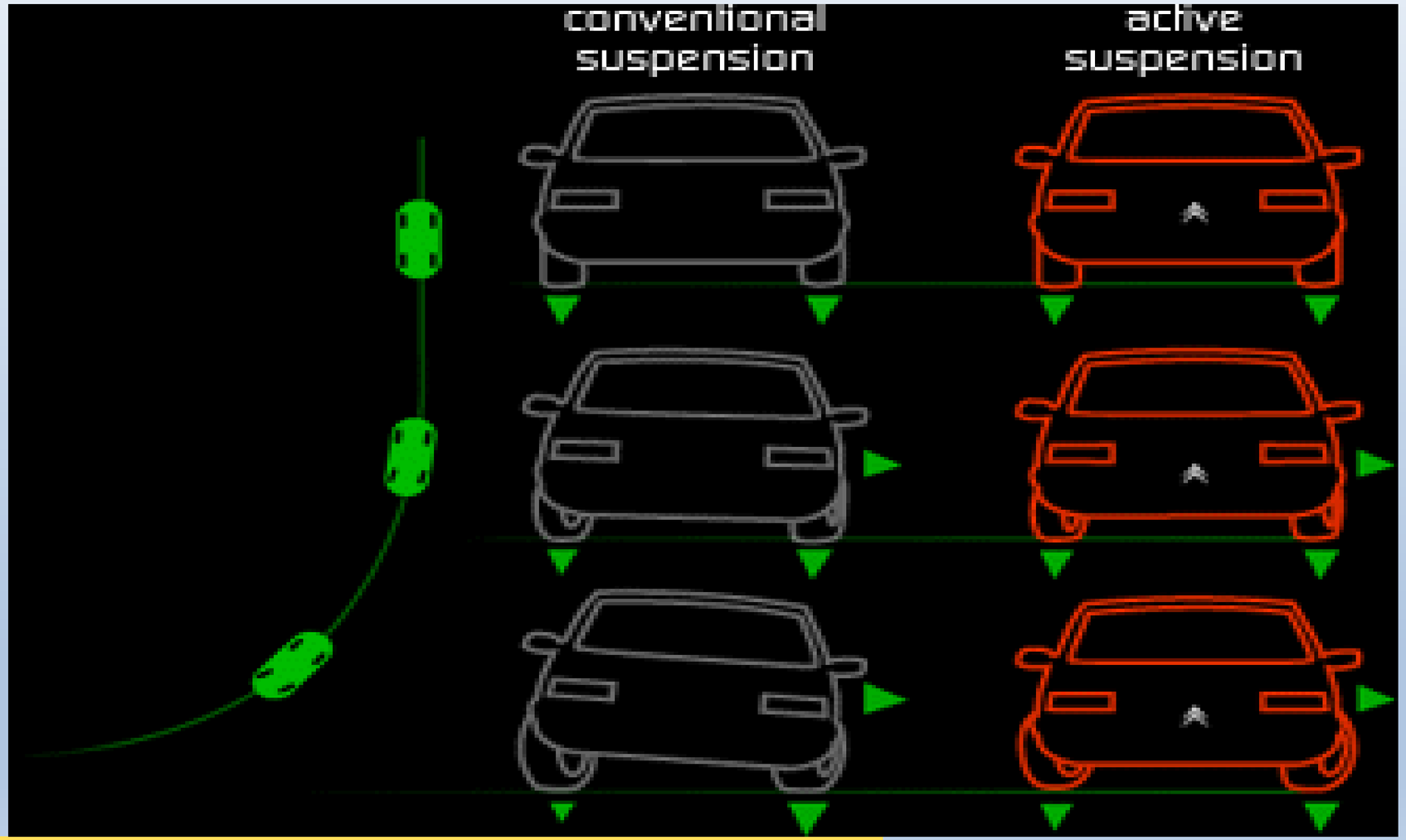


- A Computer or an electronic control unit (ECU)
- Sensors
- Actuator or Servo
- Adjustable shocks and springs

SENSORS & CONTROLLER

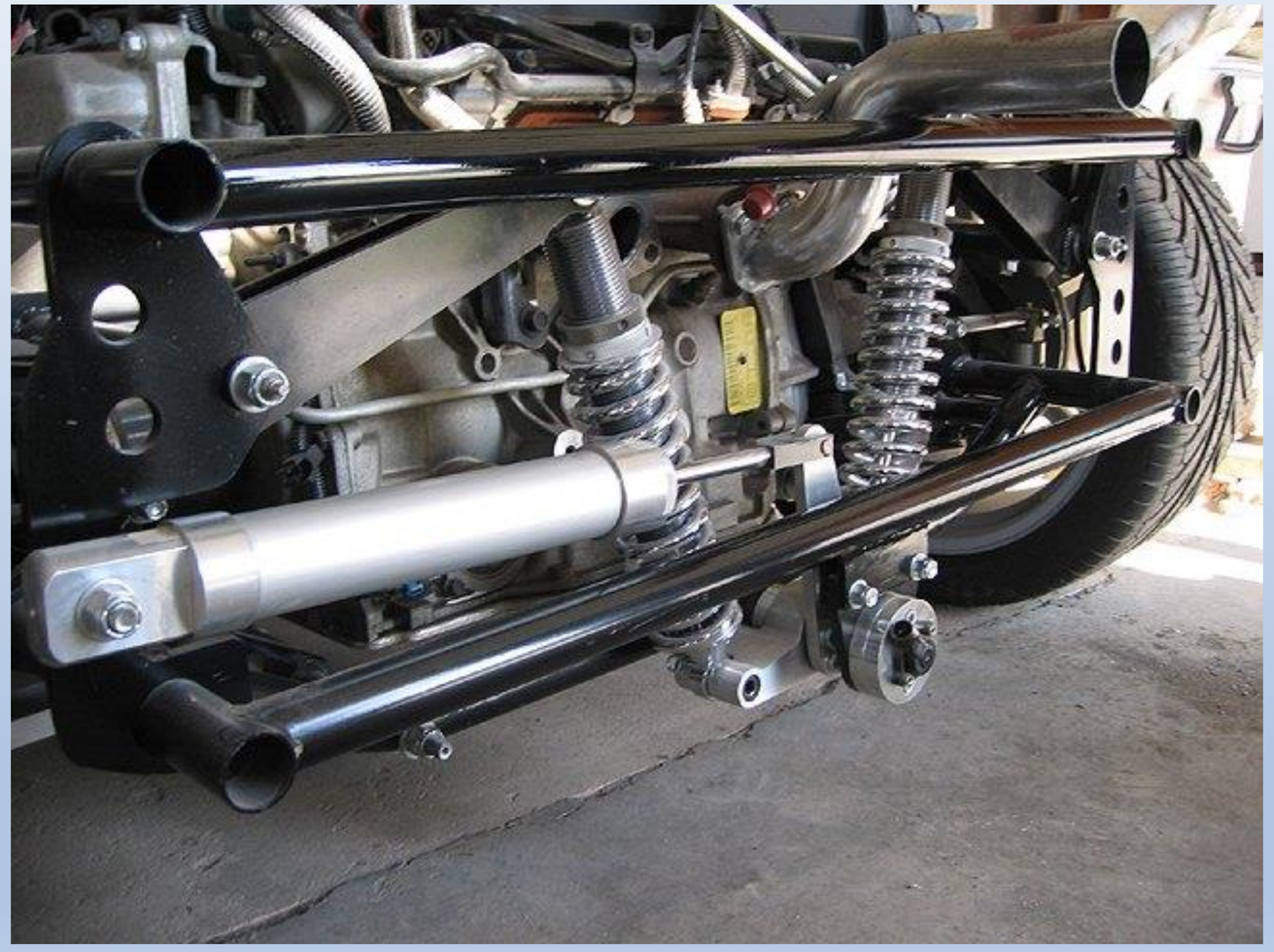


ROLL ON CORNERS



ACTIVE SUSPENSION MIMICS THE FUNCTIONS OF THE HUMAN BODY

- The sensors are nerve ends
- The Electronic Control Unit represents our mind
- Wires connecting the whole thing are the central nervous system
- The servos and actuators resemble the muso-skelatel portion



EXAMPLE

- Mercedes CL coupe

DRAWBACKS

- Need for a large external power source
- Complex control algorithms
- Complex closed-loop control systems.
- Requirement of fast-acting devices
- Increased cost

REFERENCES

- George A. Peters, Barbara J. Peters, “Automotive Vehicle Safety” CRC Press, 2002
- Richard Bishop, “Intelligent Vehicle Technology and Trends” Artech House, 2005

Thank you