

**AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY
VINAYAKA MISSION'S RESEARCH FOUNDATION**

**DEPARTMENT OF MECHANICAL ENGINEERING
TARG – Automotive Research and SAE**

Organized

One day Webinar on “EMBEDDED ENGINE MANAGEMENT SYSTEM” – 17.11.2020

The Department of Mechanical Engineering under TARG – Automotive Research and SAE organized a One day webinar on ‘EMBEDDED ENGINE MANAGEMENT SYSTEM’ on 17th November 2020.

The chief guest **Mr. G ASHWIN**, Assistant Manager, R & D – Engine Calibration, Greaves Cotton, Aurangabad, was welcomed by Prof. Dr. M Prabhakar, Department of Mechanical Engineering. The chief guest was introduced by Mr. N. Shivakumar, Asst. Professor (Gr.-II), Department of Mechanical Engineering. Nearly 90 students were participated in the webinar.

The students had an interactive session with the expert and the following contents were discussed.

- Sensors and control actuators used in automotives engines,
- Fuzzy logic and PID control applications in automotive engines,
- On board diagnostics Tool,
- Power train electronic control unit with wiring harness,
- Ignition timing and fuel injection timing control,
- Split injection strategies – Knock and Emission control, etc.

Outcome:

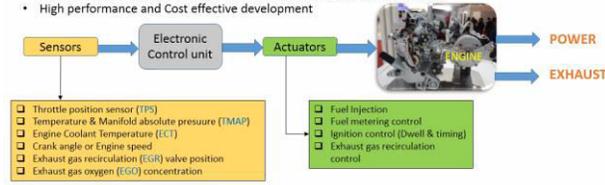
The webinar was conducted for the awareness on emission control as per Environmental Protection Agency norms in automotive sector. The Students interacted with the guest regarding Fuel Economy, Ignition & Fuel injection strategies, emission control technologies, engine modification required with the specific fuel used and various control parameters such as injection pressure, injection fuel mass, injection duration, ignition dwell period etc.

Vote of Thanks was proposed by Mr. Antony Casmir, Asst. Prof., Department of Mechanical Engineering.

POWERTRAIN ELECTRONIC CONTROL UNIT

Role of Electronics

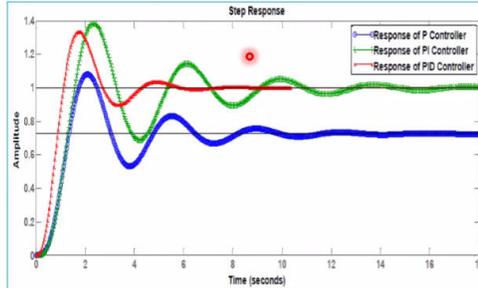
- Accuracy & precision in control of system with excellent tolerance
- Assist in meeting Regulation (e.g. Emission & Fuel economy)
- Enhanced Engine performance
- On Board System diagnosis
- Safety & Convenience
- Long term calibration stability
- Reliable information exchange across different control units
- High flexibility to manage software & hardware configuration management
- High performance and Cost effective development



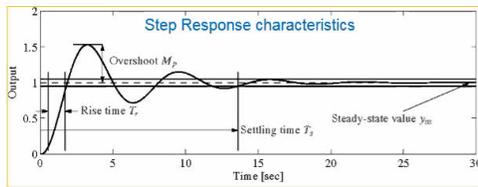
CONNECTING FOUR BIKE TO OBD SCAN TOOL / APP

Applications of PID Controller

1. **O2 Sensor** - Controlling the heater temperature (duty cycle) of Oxygen or Lambda sensor for closed loop systems
2. **Idle engine RPM** - Both open & closed loop system
3. **Electronic Throttle system** - Improve throttle/accelerator response during transient conditions.



CL RESPONSE	RISE TIME	OVERSHOOT	SETTLING TIME	STEADY STATE ERROR
Kp ↑	Decrease	Increase	Small Change	Decrease
Ki	Decrease	Increase	Increase	Eliminate
Kd	Small Change	Decrease	Decrease	Small Change

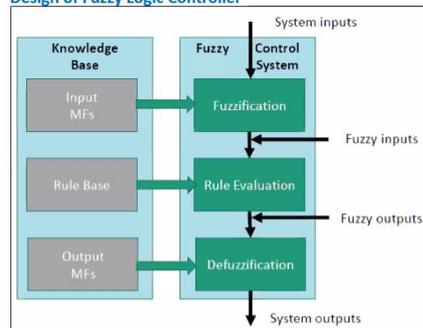


14

FUZZY LOGIC CONTROL

- ❑ Fuzzy logic can be defined as a superset of conventional (Boolean) logic that has been extended to handle
- ❑ the concept of partial truth - truth values between "completely true" and "completely false"

Design of Fuzzy Logic Controller



It is comprised of three steps that process the system inputs to the appropriate system outputs. These steps are:

- 1) Fuzzification
- 2) Rule Evaluation
- 3) Defuzzification



15