Over Steer Prevention System in Automobile

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Abstract— Vehicle active safety receives ever increasing attention in the attempt to achieve zero accidents on the road. In this project, we investigate a control system of steering that has the potential of improving stability control by achieving control on over steer and reduced chances of risk during vehicle driving. A system where active front steering is available and proposes a model predictive control strategy to coordinate the actuators. This project formulates the vehicle dynamics with respect to the over steer phenomenon and use an electromagnetic speed control characteristics on steering motion. The resulting this steering system is used as prediction model in an over steer prevention strategy. After assessing the benefits of the proposed approach, we synthesize the controller by using an automated control strategy, where the tire speed conditions (linear/saturated) are assumed for control against over steer at high speed. The system will be capable of real-time execution in automotive grade electronic control units in power steering in future.

Key words: Automotive Steering Systems, Over Steer Model, Vehicle Stability Control, High Speed, Safety

I. INTRODUCTION

Power Steering is a full electric system, which reduces the amount of steering effort by directly applying the output from an electric motor to the steering system. This research aims at developing EPS boost curve embody into the assist characteristics, improving steer portability and stability. A model for the PS system has been established, including full vehicle mechanical system, PS mechanical system, and PS electric control system. Based on this model, a straight line boost curve was designed and evaluated in this environment to improve the performance of PS system. Results showed that PS system with the designed boost curve reduced reacting time and overshoot value, thus ensure the dynamic reaction and stability. Electric power steering (EPS) system is a very important component for improving automotive handling and stability. An PS system includes mechanical subsystem and electronic and control subsystem, and it has to work in the full vehicle mechanical system. In the development process of the PS system, different subsystems have to be developed in parallel so as to reduce time and cost of system development. Cooperation between engineers for developing different subsystems is also needed. Therefore, a model-based development is a rational way for this parallel developing and cooperation One of the most important parts of the PS system is the electric control system, which receives signals collected by sensors for vehicle speed, steering angle, steering torque and controls the assistant motor for giving required assistant torque. The key of this control system is to find a boosting curve to embody the assist characteristic. Most researchers of EPS emphasize on the control strategy. Few of assist characteristics is studied. and , a boost curve is given but without calculation formula. and study the steering assist value just from road feel. A model-based development method for EPS system has been explored. A model for the PS system has been established in a full vehicle mechanical system environment. A straight line boost curve was designed and evaluated in this environment to improve the performance of PS system.

A. *Problem Statement:*

In conventional vehicles there is no any over steer control & driver's safety if vehicle moving at highest speed. So that during highest speed to avoid the emergency condition or accident while vehicle will over steer it is need to make a safety for steering control. To optimize the modified steering column by setting the control parameters at optimum level without affecting the engine performance. To overcome this problem on over steer control we introduce over steer prevention system in automobile.

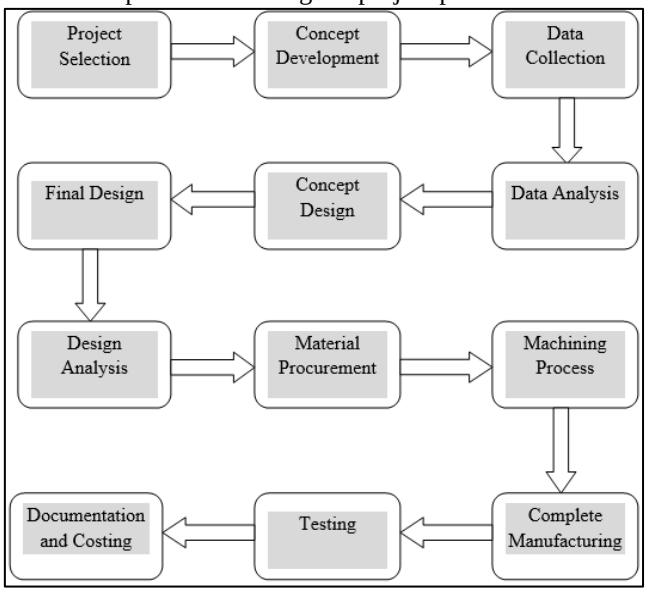
B. *Objective:*

The following objectives of the system are given below,

1) To reduce the problem of loss of control on steering at high speed vehicle running condition to avoid the accidents.
2) To provide make a reliable steering which will easily synchronizing with today's power steering system.
3) Offer control adjustment to steering steer as per driver effort requirement.
4) To maintain the response time of steering system & to maintain the driver safety in case of accident.

C. *Methodology& Steps to Solve the Problem:*

The below flow chart shows the sequential operation/steps that will be performed during the project process.



II. WORKING

A. *Steering set:*

Steering set is generally used in system to show actual steering performance of the vehicle during steering.

Fig. 1: Steering set.

As Shown in above fig. a drive system is consists of induction motor, VFD, belt transmission & driving wheel. Initially the wheel is running with the power of induction motor & VFD, at that time electromagnet is OFF due to low speed vehicle. The speed of the vehicle speed can be increases by using VFD, this speed of wheel can continuously sense by the IR Infrared sensor & give feedback to controller. When speed of the vehicle exceeds limit value then, the electromagnet is energized by the supply where the magnetic field produced is used to provide the prevention of over steer in steering mechanism. When the electromagnet is not energized, the rotation of the steering is free and accelerates uniformly under the action of effort to which the shaft is connected. When the electromagnet is energized, magnetic field is produced thereby applying resistance to over steer by retarding the rotation of the steering column. The AC motor makes the wheel to rotate through the shaft by means of pulleys connected to the shaft. The control panel is used to control performance of the system speed by varying No. of turns of coil, Current through coil ultimately the magnetic properties will be change

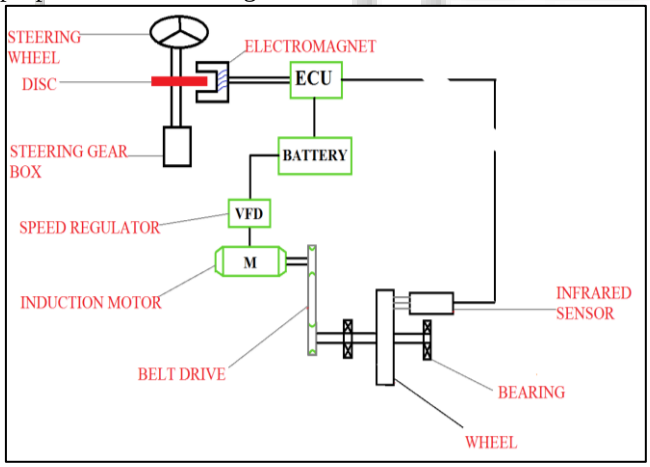


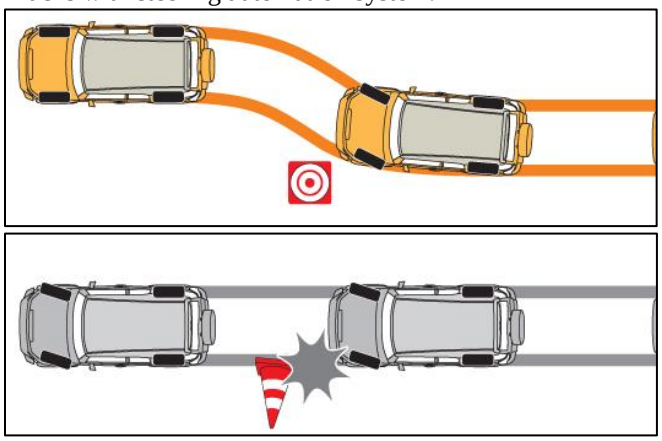
Fig. 2: Over steer prevention system in vehicle.

III. ADVANTAGES

1) The safety of driver & passenger is ensured.
2) The cost of steering modification is low.
3) The operation of the new system is well controlled.
4) Well balanced system.
5) It minimizes misalignment & less floor space is required.
6) Only simple support structures are required Design & fabrication is easy.
7) It increases the safety and working condition.

IV. APPLICATION

It is used for safety of commercial vehicles like Car, Buses & Trucks with steering automation system.



V. CONCLUSION

1) Reduce the problem of loss of control on steering at high speed vehicle running condition to avoid the accidents.
2) A reliable steering which will easily synchronizing with today's power steering system.
3) Offer control adjustment to steering steer as per driver effort requirement.
4) Maintain the response time of steering system & maintain the driver safety in case of accident

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