

HYBRID SUSPENSION SYSTEM USING FUZZY LOGIC CONTROL ELECTRO MAGNETIC SUSPENSION SYSTEM (EMSS)

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Abstract: *Electro Magnetic Suspension System (EMSS) is an independent-revolutionary suspension system that reacts instantly to changing road conditions by negating the up and down movement of wheels. Our paper proposes to amalgamate the features of superior control and greater comfort in a single system. To achieve this, we have designed a system that uses a Linear Electromagnetic Motor (LEM), which is mounted on each wheel to push and pull the wheel without jostling the car body. The electromagnetic motor use input from sensors throughout the vehicle designed to adapt to our system so as to react to bumps and potholes instantaneously. This is done by exerting downward force to extend the wheel into potholes while keeping the car level constant. As the wheel pops back up onto the road, the suspension recaptures nearly all the energy expended. We have designed a powerful control algorithm which is controlled by a fuzzy logic unit so as to provide greater momentum and reliability to the system. A detailed model of LEM has been created in which we have focused on stress distribution and displacement analysis under working conditions. We have also simulated a customized fuzzy logic controller for our system and beyond smoothing out bumpy roads, the system also improve handling, virtually eliminating body roll in tight turns and minimizing pitching motion during braking and acceleration as depicted in the performance studies.*

Keywords: *Electro-magnetic suspension system, electro-magnetic motor, fuzzy logic.*