Design of a PID Controller using ABC for a Full Vehicle Nonlinear Active Suspension System with Passenger Seat

Abstract

This paper presents a modeling and control of the nonlinear full vehicle active suspension system with passenger seat utilizing PID with artificial bee colony (ABC) algorithm technique. Five PID controllers are used. The main objective of designing the controller is to improve the performance of the suspension system, while the aim of the suspension system in automobiles is to isolate the road disturbance experienced by the tires from being transmitted to the passengers. The effects of the nonlinear forces which come from damper, spring, actuator, and parametric uncertainty in the spring, damper, and actuator has been considered, therefore robust control is utilized. The MATLAB environment is utilized to determine the performance of the proposed control scheme. A comparison is performed to illustrate the effectiveness of PID-ABC controller in terms of modifying the ride comfort and the safety of travelling passengers.

References

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**Index Terms**

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**Keywords**

Artificial bee colony algorithm PID control tuning, eight degrees of freedom vehicle model, non linear active suspensions, Matlab/Simulink, simulation.