

## Active Linear Quadratic Gaussian Secondary Suspension Control of Flexible Bodied Railway Vehicle

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**Abstract :** Passenger comfort has been paramount in the design of suspension systems of high speed cars. To analyze the effect of vibration on vehicle ride quality, a vertical model of a six degree of freedom railway passenger vehicle, with front and rear suspension, is built. It includes car body flexible effects and vertical rigid modes. A second order linear shaping filter is constructed to model Gaussian white noise into random rail excitation. The temporal correlation between the front and rear wheels is given by a second order Pade approximation. The complete track and the vehicle model are then designed. An active secondary suspension system based on a Linear Quadratic Gaussian (LQG) optimal control method is designed. The results show that the LQG control method reduces the vertical acceleration, pitching acceleration and vertical bending vibration of the car body as compared to the passive system.

**Keywords :** active suspension, bending vibration, railway vehicle, vibration control

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