A review of energy regeneration capabilities in controllable suspension for passengers’ car

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Received: 09 August 2011; accepted: 12 October 2011

Abstract

In the past few decades, passive suspension system has been widely used in passenger vehicle suspension system. The needs of improving ride and handling performance has fueled up significant researches into controllable suspension which provide variable damping and controllable force to stabilize the vehicle motions. This study reviews various research outcomes carried out in the advancement of controllable suspension system and the prospect of energy regeneration within the suspension system. There have been numerous studies being conducted on controllable suspension and most of them were proven to improve ride and handling performance of a vehicle. Nonetheless, it requires the use of external energy to power-up the suspension system. To overcome this, energy regeneration concept has been introduced to supply additional power within the suspension system by harvesting energy from road surface excitations. In realizing this concept, a suitable control scheme should be developed. The review will cover the design aspect of energy regenerating controllable suspension and the development of its control strategy. It is intended for future prospect of developing a new electromagnetic suspension with energy regeneration capability.

Keywords: Active suspension; Semi-active suspension; Control strategy; Energy harvester; Energy regeneration; Electromagnetic suspension

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