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DESIGN AND IMPLEMENTATION OF AN ACTIVE SUSPENSION SYSTEM WITH TERRAIN PREVIEW

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KEYWORDS

Active Suspension, Modelling, Terrain Preview, Optimisation, Neural Network.

ABSTRACT

One area that suspension systems with terrain preview may become viable is over rough surfaces (1,2), for example in a military environment. In this study the design and initial implementation of an active suspension system with terrain preview is investigated. A non-linear active quarter car model is developed based on an experimental test rig. The model is partially validated for both open-loop and closed-loop with terrain preview. Optimisation techniques are then used to determine the preview gains for a step at different vehicle speeds. Using simulation, the performance of the system with terrain preview is compared to that without and shown to offer a number of advantages. The preview gains are shown to vary with speed and a neural network is shown to be capable of generating these gains given the vehicle's speed.