1

Design of a rectilinear suspension with automatic length compensation branches [Texto impreso] / Jing-Shan Zhao, Xiang Liu, Zhi-Jing Feng

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 66-68 : 23 refs.

This paper proposes an independent suspension whose alignment parameters are theoretically invariable during jounce and rebound. Each kinematic chain of the suspension consists of a 3-RRR linkage that could automatically compensate for the axial distance change. The motions of the 3-RRR linkages and the knuckle are investigated from the viewpoints of screw theory and geometry. The equivalent torsional stiffness, bending stiffness and shear stiffness of a 3-RRR linkage are investigated to demonstrate the feasibility of engineering applications. Research results show that this complex linkage has better mechanical properties than those of a prismatic joint when used as a passive connection. As a result, the 3-RRR linkage has accurate alignment ability on the one hand and could keep the compact space in design while having the required strength and compliance on the other hand.

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1. Mechanism 2. Passive length compensation 3. Rectilinear suspension 4. Vehicle

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2

Development of a higher-order model for a roll simulator [Texto impreso] / Scott B. Zagorski, Dennis A. Guenther, Gary J. Heydinger

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 84-85 : 17 refs.

A four degree-of-freedom model of a roll simulator is developed. The roll simulator consists of a sled-platform assembly, where a recreational off-highway vehicle (ROV) is mounted to the platform which has the freedom to rotate up to 90 degrees. The purpose of the roll simulator is to re-create rollover manoeuvres ascertained from in-field vehicle dynamic experiments. Previous studies developed a two degree-of-freedom model; one for translational and one for rotational motion. This study expands on that model and increases the number of degrees-of-freedom to more closely emulate the roll simulator. The model incorporates non-linear stiffness models of the wire ropes and enables the model to have three translational degrees-of-freedom and one rotational degree-of-freedom. The equations of motion (EOM) are numerically simulated using Matlab's Simulink. Comparisons are made with experimental data derived from the roll simulator to validate the model.

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1. Classical dynamics 2. Higher-order models 3. Lagrange's energy equation 4. Recreational off-highway vehicles 5. Roll simulator 6. Vehicle rollover 7. Wire rope stiffness

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3

Discrete mass tyre model for ride investigation over uneven rigid terrain [Texto impreso] / Corina Sandum, Anake Umsrithong

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 105-106 : 20 refs.

The goal of this study is to develop a tyre model able to capture the vertical tyre dynamic behaviour while traversing over an uneven rigid surface. The proposed tyre model takes advantage of modelling the wheel-tyre assembly as a multi body dynamic system in order to investigate the tyre ride behaviour over such terrain. Several experiments are conducted for the tyre model parameter identification and the tyre model validation with an indoor quarter car tyre test rig and an outdoor portable tyre trailer test rig. The selected scenarios are

simulated by using the discrete mass tyre model with the tyre parameters obtained from the experiments. The simulation results of the selected scenarios are presented and compared with the experimental data.

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1. Discrete mass 2. Ride dynamics 3. Tyre model 4. Uneven rigid terrain

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4

Investigation of a driver-oriented adaptive cruise control system [Texto impreso] / Liang-kuang Chen, Chih-chi Dai, Min-fang Luo

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 38-39 : 22 refs.

The driver-oriented adaptive cruise control (DOACC) is developed using the driver drowsy index assessed by an online driver monitoring system. The longitudinal control of the adaptive cruise control (ACC) functions is designed using the sliding-mode control technique to address the unknown disturbance force in the vehicle longitudinal dynamics. The ACC system parameters are modified according to the instant driver drowsy index to allow safer vehicle range keeping for a more fatigued driver, and a less conservative control for a less fatigued driver. The developed control strategies are evaluated using computer simulations and driving simulator experiments. The results indicate that the designed control strategy modifications provide the expected functions both in simulations and in experiments, and the sliding-mode controller successfully regulates the inter-vehicle range under unknown disturbances. Experiments with the driving simulator also show that alert drivers accept the design modifications with fewer instants of gas pedal intervention and do not interfere with the brake control during stopping.

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1. DOACC 2. Driver-oriented adaptive cruise control 3. Driving simulator 4. Vehicle longitudinal control

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5

Study of air-cushion system modelling for semi-track air-cushion vehicle body attitude control [Texto impreso] / Dong Xie, Zhe Luo, Fan Yu

Este artículo se encuentra disponible en su edición impresa. Los datos para su localización están accesibles a través del enlace al título de la publicación.
References: p. 18-19 : 19 refs.

To investigate the body attitude control for a semi-track air-cushion vehicle (STACV), a multi-air-cushions design scheme is adopted. Based on the experimental study of the developed single air-cushion (1-AC) STACV prototype along with its computational fluid dynamics (CFD) simulation, a two air-cushions (2-AC) configuration with controllable orifice valves is mainly examined for the pitch control of the STACV in this paper. Firstly, the relationships among the input air total pressure, the air-cushion forces, and air-cushion system related parameters are obtained according to the relevant testing and CFD simulations from the 1-AC system. Then, the relationships among the controllable orifice valve diameters, fan rotational speed and generated air-cushion pressures of the 2-AC system are acquired using CFD simulations. Finally, the forward and reverse air-cushion system models are established by neural network. This method can be used as a reference in future body attitude control of the STACV with more air-cushions.

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1. Air-cushion system modelling 2. Body attitude control 3. CFD 4. Computational fluid dynamics 5. Neural network 6. Semi-track air cushion vehicles 7. STACV