1

Distributed occupant-seat interactions as an objective measure of seating comfort [Texto impreso] / Ali Akgunduz, Subhash Rakheja, Anthony Tarczay

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. 311-313 : 38 refs.

An automotive seat must provide the occupant with a comfortable environment in which driving can be performed in a safe and comfortable manner. The characterisation of the interactions between the occupant and the seat under various conditions thus constitutes an important goal for enhancing the knowledge of essential design factors that could yield improved seating comfort. This paper investigates the occupant-seat interactions through measurements and analyses of the distributed contact force, contact area and peak and mean pressure responses at the body-seat-pan and body-backrest interfaces of three different automotive seats. User's perceived comfort levels for various seating configurations were acquired through a survey and results were analysed through analytical hierarchy process (AHP) in order to derive a quantitative expression for the perceived comfort level. A strong correlation between perceived comfort and the peak and mean pressures on the seat-pan enabled us to derive an explicit formulation of seating comfort.

International Journal of Vehicle Design. -- 2014, v. 65, n. 4, p. 293-313

1. Analytical hierarchy process 2. Automobile seat design 3. Multicriteria evaluation 4. objective measure of seating comfort 5. Occupant-seat interaction

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2

Game theory based autonomous vehicles operation [Texto impreso]/ Changwon Kim, Reza Langari

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. 381-382 : 30 refs.

In this paper, we propose a game theory based approach to decision making with application to the operation of autonomous ground vehicles in highway setting. The mixed-motive game theory is utilised as a decision-making strategy in the context of a two-player game involving autonomous vehicles. The payoff matrices are defined by considering the safety of each players decision combination in view of their desire to stay within a given lane or to change lanes in consideration of the traffic conditions that the vehicles encounter. By analysing the payoff matrix, either a pure (deterministic) strategy or a mixed (probabilistic) strategy is selected. Three 10 km velocity profiles are predefined for simulation purposes. The simulation results demonstrate effective driving performance. In particular when it is compared with non-game theory cases, game theory based results show larger payoff for both vehicles and smaller payoff differences, securing safe manoeuvring via lane change manoeuvre (LCM) and adaptive cruise control (ACC).

International Journal of Vehicle Design. -- 2014, v. 65, n. 4, p. 360-383

1. Autonomous vehicles 2. Game theory 3. Mixed motive games 4. Virtual bumper

3

Optimum tyre force distribution for four-wheel-independent drive electric vehicle with active front steering [Texto impreso] / Yifan Dai, Yugong Luo, Wenbo Chu, Keqiang Li

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. 358-359 : 33 refs.

Tyre workload is widely used as performance index in tyre force distribution. The existing methods are limited by either the uneven distribution result or too many constraints. To maximise vehicle stability margin while not involving too many constraints, an optimum tyre force distribution method based on minimising the variance and mean value of tyre workload for four-wheel-independent drive electric vehicle with active front steering (AFS) is proposed. The operations of driver are explained as the desired total longitudinal and lateral force and yaw moment constraints. The four longitudinal tyre forces and the lateral force of the front axle are obtained by using quasi-Newton method for solution. The simulation results show that the proposed method can increase the maximum safe speed by several percents when compared to the existing methods. Vehicle test verifies that the adhesion margin of the vehicle is kept to a high level, which will enhance the stability performance.

International Journal of Vehicle Design. -- 2014, v. 65, n. 4, p. 336-359

1. AFS 2. Active front steering 3. Force distribution 4. Four-wheel-independent drive 5. Quasi-Newton method 6. Tyre workload

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4

Robust tracking control of vehicle lateral dynamics [Texto impreso] / Haiping Du, Nong Zhang, Weihua Li

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. 334-335 : 21 refs.

In this paper, a robust yaw moment controller is designed to improve vehicle handling and stability. Three issues regarding to vehicle mass variation, cornering stiffness uncertainty, and tracking control are considered in the controller design process. To deal with these issues, parameter-dependent control strategy, norm-bounded uncertainty description, and tracking error feedback are applied. The control objective is to stabilise the closed-loop system and to optimise the tracking performance on yaw rate and sideslip angle with respect to their targets. The condition for designing such a controller is derived in terms of linear matrix inequality (LMI). Numerical simulations on a nonlinear vehicle model are performed to validate the effectiveness of the proposed approach. The results show that the designed controller can improve vehicle handling and stability regardless of the variation of vehicle mass and the change of road surface.

International Journal of Vehicle Design. -- 2014, v. 65, n. 4, p. 314-335

1. Uncertainty 2. Vehicle lateral dynamics 3. Yaw moment tracking control

5

Terramechanics and its applications to the evaluation of terrestrial and extraterrestrial vehicle mobility: theory into practice [Texto impreso] / J.Y. Wong

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. 409-410 : 22 refs.

This paper traces the development of terramechanics - the study of the mechanics of vehicle-terrain interaction that provides the foundation for a comprehensive understanding of the behaviour of a vehicle operating on unprepared terrain. It highlights the development of computer-aided methods for performance and design evaluation of tracked and off-road wheeled vehicles, based on the principles of terramechanics. Examples of the applications of these computer-aided methods to guiding the development and design of off-road vehicles on earth, as well as the evaluation of the performance of rovers for exploration of the Moon, Mars and beyond, are presented. These signify that results of research on terramechanics have been put into engineering practice in enhancing the development of terrestrial and extraterrestrial vehicles. Prospects for further development of terramechanics, as well as challenges and opportunities in the field, are reviewed.

International Journal of Vehicle Design. -- 2014, v. 65, n. 4, p. 384-410

1. Computer-aided methods 2. Extraterrestrial rovers 3. Mobility 4. Off-road vehicles 5. Terramechanics