**1**

**A new traction control system for the vehicle with automatic transmission [Texto impreso] / Xiao-Wei Li, Jun-Wu Shi, Tong-Li Lu, Jian-Wu Zhang**

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. 347-348 : 23 refs.

A new Traction Control System (TCS) based on the integrated control of gear shifting and throttle for the vehicle with automatic transmission is proposed. By means of differential geometry theory, the slip control system with non-linearity and uncertainties is transformed into a linear one. Then, the sliding mode control is introduced for the purpose of raising the robustness of the system. Furthermore, according to the dynamic programming, the optimal throttle opening and gear position are solved for the required driving torque. The simulation results indicate that the present TCS is characterised by its simple structure and good performance.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 333-350

1. TCS 2. Traction control system 3. Feedback linearisation 4. Sliding mode control 5. Dynamic programming

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**2**

**A sliding mode controlled three wheeled narrow vehicle [Texto impreso] / Nestor Roqueiro, Enric Fossas-Colet, Marcelo Gaudezi de Faria**

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. 145-146 : 25 refs.

This paper presents a sliding mode controller for a narrow tilting three-wheeled vehicle. The vehicle is modelled as a dynamic eighteen-order system with two inputs and two outputs, however, a simple third-order model of a bicycle is considered for design and analysis. The appropriateness of the simpler model for design purposes is verified through simulations. The designed trajectory control considers vehicle stability limits and takes advantage of the bicycle model flatness. Tilting and speed controllers are designed in the sliding mode framework through the analytical development of the bicycle model and simulated in the full eighteen-order system.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 123-146

1. Sliding mode control 2. Flatness 3. Set-point generator 4. Tilting vehicles 5. Reduced nonlinear models

**3**

**Application of variable-structure output feedback control to active front steering for understeer and oversteer conditions [Texto impreso] / Youssef A. Ghoneim**

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. 121-122 : 17 refs.

This paper describes an approach to the design of Active Front Steering (AFS) based on Variable-Structure Output Feedback Control (VSOFC) with integral action to enhance vehicle stability during understeer and oversteer conditions. We determine the understeer and oversteer behaviour of the vehicle and we change the AFS control strategy based on the understeer and oversteer behaviour of the vehicle so that the road wheel steering angle is in the ideal position to provide the intended steering angle. The control law ensures not only that the vehicle trajectory follows a desired reference trajectory but also that its convergence rate can be specified. Finally we present simulation results to demonstrate the potential benefits of the control strategy under different driving scenarios.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 106-122

1. AFS 2. Active front steering 3. Variable-structure control

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**4**

**Condition monitoring of gasoline engine air intake system using second order sliding modes [Texto impreso] / Qadeer Ahmed, Aamer Iqbal Bhatti, Qudrat Khan, Mohsin Raza**

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. 330-332 : 22 refs.

This paper presents a novel strategy for the condition monitoring of Air Intake System (AIS) of a gasoline engine. The aim is to detect and identify manifold leakages and throttle valve fault. These two faults directly affect AIS performance that results in poor engine efficiency. Two critical and immeasurable engine parameters i.e., Throttle Discharge Coefficient (CD) and Volumetric Efficiency (ηvol) are employed to monitor aforementioned faults. These parameters are estimated using Mean Value Engine Model (MVEM) and super twisting algorithm based Second Order Sliding Mode Observers (SOSMOs). Nominal values of the estimated parameters are used to generate residuals. These residuals are then evaluated to classify system health. A successful validation of the proposed scheme is conducted to diagnose and classify the health status of On Board Diagnostics version-II compliant commercial vehicle engine. The presented scheme is computationally cheap for online implementation and is readily applicable to cater for production line spread of single make.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 312-332

1. Automotive engine 2. Manifold leakages 3. Throttle valve faults 4. Second order sliding mode observer and fault diagnosis

**5**

**Heavy duty vehicle tyre forces estimation using variable gain sliding mode observer [Texto impreso] / O. Khemoudj, H. Imine, M. Djemaï**

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. 288 : 12 refs.

In this paper an original method for estimating heavy duty vehicle tyre forces is presented. The method is based on a variable gain sliding mode observer. The main on-board sensors are available through the CAN-bus of the vehicle to which low-cost sensors are added. The approach is validated by comparing the estimated forces to those provided by the software vehicle dynamics simulator PROSPER.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 274-288

1. Heavy duty vehicles 2. Sliding mode observers 3. Variable gain 4. Exact differentiator 5. On-board sensors

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**6**

**Improvements in vehicle handling and stability by a novel wheel slip coordination control scheme [Texto impreso] / Xiujian Yang**

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. 228-229 : 23 refs.

A novel control scheme is proposed to improve the vehicle stability by coordinating the slips of the two wheels on the same side simultaneously. This scheme is a three-level structure that includes the first level of yaw moment controller, the second level of brake force distributor and the third level of wheel slip regulator. Brake force distributor distributes the desired brake forces to the two wheels on the same side properly and the wheel slip regulator is designed to track the desired slips from the brake force distributor. Simulation results of the proposed control scheme are rather satisfying.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 206-230

1. Vehicle dynamics 2. Vehicle handling and stability 3. Yaw moment control 4. Chassis coordinated control 5. Wheel slip control 6. Sliding mode control

**7**

**Nonlinear sliding mode control of switched systems on continuously variable transmission shifting [Texto impreso] / L. He, L. Li, L.Y. Yu, J. Song**

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. 309-310 : 16 refs.

The control of speed ratio on Continuously Variable Transmission (CVT) is one of the key problems for CVT development. In this paper, a nonlinear Sliding Mode Control (SMC) law of switched systems is designed and employed to control the CVT shifting. Because the CVT shifting control system contains discontinuous characteristics, the way of Filippov solution with discontinuous righthand side is used to design the sliding mode controller. Through the validation of simulation and on-board experiments, it can be concluded that the nonlinear SMC law is a better candidate to control the CVT shifting.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 289-311

1. CVT 2. Continuously variable transmission 3. SMC 4. Sliding mode control 5. Switched system 6. Shifting

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**8**

**Robust control of electronic wedge brake with adaptive pad friction estimation [Texto impreso] / Yunhyoung Hwang, Seibum B. Choi**

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. 186-187 : 11 refs.

This paper suggests an adaptation scheme for robust control of Electronic Wedge Brake (EWB) and estimation of pad friction-coefficient. The Electronic Wedge Brake is highly energy-effective as it uses self-reinforcement. But accordingly, it can be sensitive to the parametric variation, particularly to the pad friction-coefficient. The suggested scheme reduces the effect of the variation of pad friction-coefficient on system robustness and provides a way of estimation of the friction-coefficient in real time. The series of simulation results verify the performance of suggested control scheme.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 165-187

1. EWB 2. Electronic wedge brake 3. Brake-by-wire 4. Adaptive sliding-mode control 5. Pad friction-coefficient 6. Brake control 7. Vehicle control 8. Vehicle dynamics

**9**

**Robust nested sliding mode integral control for anti-lock brake system [Texto impreso] / Juan Diego Sánchez-Torres, Alexander G. Loukianov, Marcos I. Galicia, Jorge Rivera Domínguez**

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. 203-205 : 34 refs.

An integral nested Sliding Mode (SM) block control is proposed to control an Anti-lock Brake System (ABS) by employing integral SM and nested SM concepts. The control problem is to achieve reference tracking for the slip rate, in such a way that the friction between the tyre and the road surface is good enough to control the car. The closed-loop system is robust in the presence of matched and unmatched perturbations. To show the performance of the proposed control strategy, a simulation study is carried on, where results show good behaviour of the ABS under variations in the road friction.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 188-205

1. ABS 2. Anti-lock brake system 3. SB 4. SMC 5. Sliding mode control 6. Integral control 7. Automotive
control

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**10**

**Second order sliding modes control for rope winch based automotive driver robot [Texto impreso] / Benedikt Alt, Elias Hermann, Ferdinand Svaricek**

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. 162-164 : 29 refs.

This paper presents a sliding mode controller for a narrow tilting three-wheeled vehicle. The vehicle is modelled as a dynamic eighteen-order system with two inputs and two outputs, however, a simple third-order model of a bicycle is considered for design and analysis. The appropriateness of the simpler model for design purposes is verified through simulations. The designed trajectory control considers vehicle stability limits and takes advantage of the bicycle model flatness. Tilting and speed controllers are designed in the sliding mode framework through the analytical development of the bicycle model and simulated in the full eighteen-order system.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 147-164

1. Second order sliding modes control 2. Variable structure systems 3. Electrical drives 4. Automotive
applications

**11**

**Sliding-mode-based disturbance observer approaches for vehicle steering control [Texto impreso] / Murat Demirci, Metin Gokasan**

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. 271-273 : 47 refs.

Disturbance observer estimates a disturbance on the control input channel by using past measurements instead of estimating the disturbance itself and is a very powerful method to improve vehicle motion dynamics. This study proposes two new disturbance observer approaches for vehicle steering control, which are based on Sliding Mode Control (SMC) theory. The controllers estimate the equivalent input extended-disturbance in the control input channel. The extended-disturbance includes modelling and parameter uncertainties of the vehicle in addition to external yaw disturbances caused by side wind, μ-split braking, etc., The steering controllers have been tested on a Fiat Doblo Van modelled in CarSim environment. The sliding-mode-based disturbance observer approaches developed in this work are the first known applications to vehicle steering control. The performances of the proposed vehicle steering control systems have been compared with the performances of the Inverse-Model-based Disturbance Observer (IMDO) approach, which is a well-known disturbance observer method for motion control.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 254-273

1. Disturbance observer 2. Steering control 3. SMC 4. Sliding mode control 5. VDC 6. Vehicle dynamics control 7. Vehicle stability

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**12**

**Wheel slip control of road vehicles via switched second order sliding modes [Texto impreso] / Mara Tanelli, Antonella Ferrara**

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. 251-253 : 39 refs.

Longitudinal wheel slip control is a crucial problem in automotive systems, as it it is the basis for traction, braking and stability control. Slip dynamics get faster, and thus more difficult to govern for the rider, as speed decreases: hence, at low speed one would willingly lose tracking performance in exchange for increased safety. To achieve this, we propose a novel Switched Second Order Sliding Mode (S-SOSM) control strategy, which allows enhancing the closed-loop performance and to tune them to the current working condition. The validity of the approach is on traction control of two-wheeled vehicles.

International Journal of Vehicle Design. -- 2013, v. 62, n. 2-4, p. 231-253

1. Second order sliding mode 2. Switched systems 3. Wheel slip control 4. Automotive systems 5. Two-wheeled vehicles