1

Analysis and modelling of tyre in-plane time domain simulation with modal parameter tyre model [Texto impreso] / Jin Shang, Dihua Guan, Baojiang 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. 38 : 12 refs.

Virtual proving ground simulation is important in vehicle product development, which requires tyre dynamic simulation in the time domain. This paper uses the modal parameter tyre model (MPTM) to obtain the static vertical properties that match the experimental results well and then presents a complete analytical model based on MPTM for in-plane time domain simulation that involves tyre rolling movement, tyre mechanics and typical working conditions. The computational method is also proposed. Results show that the steady state result is consistent with the convergent result of dynamic simulation. Further, this article presents simulation results in both time and frequency domains and compares them with experimental results, calculating rolling resistance, etc. The model and its computational method can be applied for more complex theoretical analysis and simulation in tyre mechanics.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 18-38

1. Modal parameter 2. Tyre modelling 3. Time domain simulation 4. Rolling speed 5. Damping ratio 6. Rolling resistance

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2

Dynamics and control of gear upshift in automated manual transmissions [Texto impreso] / Bingzhao Gao ... [et al.]

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. 81-83 : 39 refs.

Automated Manual Transmission (AMT) is suitable for heavy-duty vehicles to offer an easy drive and good fuel efficiency. After the dynamics and control problems of gear upshift of AMT are described in detail,
Model Predictive Control (MPC), together with a shaft torque observer, is adopted to address these challenging control problems. It is demonstrated through simulations that by using the proposed control scheme of gear shifting, a very short torque interruption time can be achieved, while the shift shock is kept small enough.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 61-83

1. AMT 2. Automated manual transmission 3. Gear shift 4. Clutch 5. MPC 6. Model predictive control 7. Torque estimation

3

Heat transfer effects on the performance of an air-standard irreversible dual cycle [Texto impreso] / Yasin Ust, Bahri Sahin, Hasan Kayhan Kayadelen, Guven Gonca

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. 114-115 : 33 refs.

The objective of this study is to analyse the effects of heat transfer loss and internal irreversibilites, resulting from adiabatic processes, on an irreversible diesel heat engine. Thermodynamic optimisation has been carried out based on the Maximum Power (MP), Maximum Thermal Efficiency (MEF) and Maximum mean Effective Pressure (MEP) criteria for the dual cycle. Power output, thermal efficiency and mean effective pressure are obtained by introducing variable compression ratio, inlet temperature, combustion and heat transfer constants, and compression and expansion efficiencies. Optimal performance and design parameters of the dual cycle are obtained numerically for the MP, MEF and MEP conditions. The optimal compression ratio and pressure ratio at MEP conditions are compared with those results obtained by using the MP and MEF criteria for different constants of heat transfer and combustion in the characteristic grid curves. The results obtained in this paper may provide a guide to the performance and improvement of practical diesel engines.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 102-116

1. Dual cycle 2. Optimal performance 3. Performance analysis 4. Thermodynamic optimisation 5. Combustion 6. Heat transfer

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4

On the impact of the regulatory frontal crash test speed on optimal vehicle design and road traffic injuries [Texto impreso] / Steven Hoffenson, Matthew P. Reed, Yannaphol Kaewbaidhoon, Panos Y. Papalambros

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. 59-60 : 26 refs.

Many countries have instituted New Car Assessment Programs (NCAPs) to help consumers compare the crashworthiness of automobiles on the market. These typically involve four or five standardised tests, for which each new vehicle is rated on a 5-star scale. The ratings are available to customers and so, automakers strive for high scores by optimising their vehicle designs to the scenarios represented by the tests. The United States NCAP rates vehicles for frontal crashworthiness with a 56 kilometres per hour (35 miles per hour) full-engagement barrier collision, which is a relatively severe test, considering that over 98% of crashes on US roadways occur at slower speeds. This paper presents a methodology for understanding the impact of the NCAP crash test speed on vehicle design and the consequent on-road safety outcomes, using physics-based simulations and optimisation tools. The results suggest that lowering the test speed from the current level to 48 kilometres per hour (30 miles per hour) may decrease the rates of serious injuries to vehicle occupants in the US by up to 21%.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 39-60

1. Automotive safety 2. Crashworthiness 3. Design optimisation 4. New car assessment program 5. Vehicle design

5

Procedure to verify the suspension system on periodical motor vehicle inspection [Texto impreso] / José A. Calvo, José L. San Román, Carolina Álvarez-Caldas

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. 16 : 8 refs.

The suspension system of a vehicle is an essential element which assures driving safety and passenger comfort. The shock absorbers are the key component of this system. A worn out damper reduces the tyre-road contact, resulting in increased stopping distances. Similarly, lateral stability may be compromised as a result of uncontrolled rolling movements. In order to maintain safe driving conditions, it is essential to verify the status of the suspension system during Periodic Motor Vehicle Inspections (PMVI) using efficient procedures. The current method to verify the suspension system at PMVI stations is not reliable.
This paper proposes a procedure that uses a new test bench that allows to know the real status of the suspension system of a vehicle and is based on identifying the damping ratio of the shock absorbers.

Proposed procedure has been validated by experimental tests.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 1-17

1. Suspension systems 2. Vehicle inspection 3. Shock absorbers 4. Damping coefficient 5. Vehicle suspensions

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6

Road-frequency based optimisation of damping coefficients for semi-active suspension systems [Texto impreso] / Arjon Turnip, Keum-Shik Hong

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. 98-100 : 38 refs.

In this paper, a sequential quadratic programming method for determining the optimal damping coefficients of a semi-active suspension system is investigated. Two objective functions (i.e., mean squares of the sprung-mass absolute acceleration and the dynamic load) are minimised under four constraints. By splitting the road frequency range into four regions, the optimal damping coefficients in individual regions are obtained. Simulation results of three cases (passive, semi-active with optimal static damping coefficients, and semi-active with optimal dynamic damping coefficients) show that the semi-active suspension system significantly improve the ride comfort, road holding, and reduce the noise and harshness.

International Journal of Vehicle Design. -- 2013, v. 63, n. 1, p. 84-101

1. Suspension control 2. Semi-active damping 3. Road frequency 4. Ride comfort 5. Road holding 6. Optimisation 7. Modified skyhook control