1

Calculation of joint forces of a multi-link suspension for strength and fatigue analysis of bushings and control arms [Texto impreso] / Xiao-Li Wang; Lin Dai, Wen-Bin Shangguan

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. 234 : 14 refs.

The joint forces and moments of a multi-link suspension are important parameters for fatigue analysis and experiment of bushings and control arms in the suspension. A modelling and calculation method for obtaining the joint forces and moments for a multi-link suspension is developed. In modelling of a multi-link suspension, a bushing is modelled with three translational stiffness and three torsional stiffness along and around three orthogonal axes. The force vs. displacement along one axis is non-linear and simplified as piecewise linear. Taking a rear five-rod suspension as one example, the forces and moments for each joint are calculated with the proposed method and compared with that using a conventional method. It is shown that the proposed model and calculation method can be used to evaluate the joint forces and moments for determining input loads for the design and fatigue test of bushings and control arms in a multi-link suspension.

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1. Control arm 2. Fatigue analysis 3. Joint force 4. Moment calculation 5. Multi-link suspension 6. Non-linear bushing

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2

Development of a novel identification platform for automotive dampers [Texto impreso] / Jianguang Fang, Yunkai Gao, Guangyong Sun, Qing 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. 294-296 : 47 refs.

Traditional approaches with manual regulation of damping parameters could often be too difficult to yield correct parameters due to high nonlinearity and cross effects between different parameters involved. To tackle the problem, this paper proposes a new approach to the identification of the damping parameters for a shock absorber. In this approach, the parameter identification is modelled as an optimisation problem, in which the discrepancy between simulation and test curves is formulated as the objective function and the damping parameters to be identified are regarded as design variables. The kriging model is updated iteratively and an optimum is sought by the particle swarm optimisation (PSO) algorithm until convergence. The effectiveness and robustness of the proposed platform is validated by correlating the simulation results obtained from the identified damping parameters to the corresponding experimental results in the case of a full vehicle.

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1. Parameters identification 2. Particle swarm optimisation 3. PSO 4. Sequential sampling 5. Vehicle damper 6. Vehicle system dynamics

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3

Neuro-genetic optimisation of disc brake speed sensitivity [Texto impreso] / Dragan Aleksendric, Velimir Cirovic

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. 270-271 : 31 refs.

Since the driver obtains important feedback of a vehicle's dynamics and its braking capabilities depending on the change of brake performance, it represents an important aspect of a vehicle's performance
and its quality of use. Sensitivity of braking torque vs. the friction couple interaction, under different braking conditions, is one of the most important properties of the disc brake. In this paper, we

investigated possibilities for an intelligent dynamic optimisation of automotive braking system performance. The hybrid neuro-genetic optimisation model was developed in order to perform dynamic control and optimisation of the disc brake performance during a braking cycle. This model provided stabilisation of the brake performance and their maximisation vs. the brake pedal travel, selected by the driver, and the influence of the initial speed during a braking cycle. The model provided the disc brake actuation pressure which is adjusted upto the level that provides stable and, for current braking regimes, maximum braking torque values.

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1. Disc brake 2. Genetic algorithms 3. Neural networks 4. Optimisation 5. Performance 6. Sensitivity 7. Vehicle design

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4

Optimal engine torque management for reducing driveline clunk using time-dependent metamodels [Texto impreso] / Zissimos P. Mourelatos, Daniel Wehrwein

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. 256-257 : 29 refs.

Driveline clunk negatively affects the perceived vehicle quality and must be minimised. This is usually achieved using engine torque management which must be balanced against throttle response. In practice, the engine torque rate of rise is calibrated manually. This paper describes a methodology for calibrating the engine torque to minimise the clunk disturbance, while still meeting throttle response constraints. Using a set of engine torque profiles and the corresponding turbine speed responses, a time-dependent metamodel is created using principal component analysis and kriging. The metamodel predicts the turbine speed response due to any engine torque profile and is used in a subsequent optimisation to minimise a clunk disturbance measure while still meeting the throttle response target. The optimal engine torque profile and corresponding turbine speed were successfully validated experimentally. We reduced the clunk disturbance by 33% while improving the throttle response by 11%.

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1. Driveline clunk 2. Engine torque management 3. NVH 4. Optimisation 5. Time-dependent metamodelling

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5

Quasi-dimensional modelling of turbulence-driven phenomena in SI engines [Texto impreso] / Adolf Nefischer, Jens Neumann, Andrei Stanciu, Andreas Wimmer

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. 314-316 : 53 refs.

In the present work, various basic approaches regarding the quasi-dimensional description of the combustion and the resulting wall heat transfer within SI engines are reviewed and analysed to promote the understanding and to enable modelling improvements. Owing to the dominant role of turbulence, models for the description of the turbulent flow in the combustion chamber are first analysed. The importance of taking into account the influence of combustion when calculating the wall heat transfer of various fuels is shown based on model comparisons. A hypothesis regarding the interaction of turbulence and combustion is also presented. A general formulation of the turbulent flame speed is developed covering the premixed combustion of different fuels. Measurements of the wall heat flux, optical examinations of the flame propagation and thermodynamic measurements are used for validation. Furthermore, good correlations between corresponding measurements and simulations with the derived phenomenological approaches are demonstrated.

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1. Combustion 2. SI engine 3. Simulation 4. Turbulence 5. Wall heat transfer