1

Conceptual design of battery electric vehicle powertrains [Texto impreso] / Bartosch Czapnik, Ismail Levent Sarioglu, Hendrik Schröder, Ferit Küçükay

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. 155-156 : 21 refs.

Alternative vehicle powertrain systems are currently the most promising solutions to meet the energetic and ecological challenges in the individual mobility. To accomplish the keen competition, considering the decreasing lead time and costs for a vehicle design and the aim to develop the optimal powertrain design, methods that ensure a quick evaluation of various configurations of a powertrain system are required. Although utilising powertrain simulation models is a common approach in powertrain design, there is a need for quick generalised analytical models. In this paper, an analytical model is developed using the example of a battery electric vehicle (BEV) with the aim of a quick exploration of powertrain design solutions. Moreover, a comparison between the analytical method and a numerical simulative method with respect to their accuracies and complexities is shown. Finally, a Pareto frontier analysis of energy consumption, driving performance, range and cost for BEVs is accomplished.

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1. Analytical method 2. Battery electric vehicle 3. BEV 4. Component scaling 5. Conceptual design 6. Driving performance 7. Energy consumption 8. Optimun 9. Powertrain 10. Pareto frontier analysis 11. Search space 12. Simulation

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2

In-wheel motor electric vehicle state estimation by using unscented particle filter [Texto impreso] / Wenbo Chu, Yugong Luo, Yifan Dai, 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. 133-134 : 29 refs.

Vehicle state parameters are essential for active safety stability control and very valuable in chassis design evaluation. In this paper, a method for vehicle state parameters estimation is developed for in-wheel motor (IWM) electric vehicle (EV). The observer is based on information fusion combining standard sensor suite in today's typical vehicle and feedback signals from IWM. This paper utilise unscented particle filter (UPF) for tyre lateral force, longitudinal velocity, lateral velocity and yaw rate estimation, which is based on a numerically efficient nonlinear stochastic estimation technique. Planar vehicle model and dynamic tyre model are developed to describe behaviour of IWM EV. Detailed simulation verifies the validation and robustness of proposed estimation algorithm.

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1. EV 2. Electric vehicle 3. IWM 4. In-wheel motor 5. State estimation 6. UPF 7. Unscented particle filter

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3

Lateral-slip characteristics and combined model for vehicle tyres [Texto impreso] / Chen Huang, Long Chen, Hao-bin Jiang, Chao-chun Yuan

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References: p. 217-218 : 21 refs.

It is important to model vehicular tyre movements and their lateral-slip characteristics because they affect safety while steering. In this study, we have used an artificial neural network (ANN) for modelling to solve issues such as insufficient learning adaptation and poor computability. However, because of the number of network nodes and layers and the superposition principle, the identification rate was low and node positions were uncertain. Hence, BDI-agent technology was introduced to optimise the training process of ANNs. We

investigated and compared the performances of two models - the magic-formula-based and ANN-based models - for analysing tyre forces under combined representations of longitudinal and lateral forces. Our simulation results showed that the ANN-based model with BDI-agent performed better than the magic-formula-based model, and its mean error was low at 1.5%.

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1. BDI-agent 2. Lateral-slip characteristics 3. Neural network 4. Tyre

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4

Sources of power loss during torque-vectoring for fully electric vehicles [Texto impreso] / Andrew Pennycott, Leonardo De Novellis, Patrick Gruber, Aldo Sorniotti

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References: p. 175-177 : 32 refs.

Continuous wheel torque control of fully electric vehicles (FEV) offers potential improvements in vehicle dynamics and energy efficiency. Various studies have shown benefits from torque-vectoring for minimising vehicle power consumption by considering the losses from the electric motor drives. However, during vehicle operation, various sources of power loss exist such as dissipations due to longitudinal and lateral tyre slip which are strongly influenced by the wheel torque control system. In this study, the different power loss types during steady-state and transient manoeuvres of a case study four-wheel-drive FEV are quantified. The motor drive losses are a major contributor at low lateral acceleration but represent a secondary factor at significant lateral acceleration at which the tyre slip power losses are the most significant contribution. Future control allocation methods seeking to reduce power consumption should consider tyre slip in addition to actuator losses.

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1. Electric vehicles 2. Control allocation 3. Efficiency

5

A tool to evaluate the impacts of an innovation on a product's recyclability rate by adopting a modular approach: automotive sector application [Texto impreso] / Julien Garcia, Dominique Millet, Pierre Tonnelier

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. 203-204 : 29 refs.

Alternative vehicle powertrain systems are currently the most promising solutions to meet the energetic and ecological challenges in the individual mobility. To accomplish the keen competition, considering the decreasing lead time and costs for a vehicle design and the aim to develop the optimal powertrain design, methods that ensure a quick evaluation of various configurations of a powertrain system are required. Although utilising powertrain simulation models is a common approach in powertrain design, there is a need for quick generalised analytical models. In this paper, an analytical model is developed using the example of a battery electric vehicle (BEV) with the aim of a quick exploration of powertrain design solutions. Moreover, a comparison between the analytical method and a numerical simulative method with respect to their accuracies and complexities is shown. Finally, a Pareto frontier analysis of energy consumption, driving performance, range and cost for BEVs is accomplished.

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1. Automotive sector 2. Evaluation tool 3. Hybrid motorisation 4. Innovation 5. Management of the end-of-life options 6. Modular approach 7. Recyclability