1

Fault tree analysis of hydraulic power-steering system [Texto impreso] / Catic Dobrivoje, Gasic Milomir, Savkovic Mile, Glisovic Jasna

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. 44-45 : 32 refs.

The historical development is presented in the introductory part and it points out the importance of using the Fault Tree Analysis (FTA) method for analysis of the reliability and safety of technical systems. By analysing a number of references related to the FTA method, a FTA methodology is established, whose algorithm, with explanation of some steps, is given in this paper. As an example of the practical application of the method, the fault tree of the hydraulic power booster of the steering system of light commercial vehicles is qualitatively analysed. Based on data from the development phase and through a team approach, a fault tree for hydraulic power steering was developed. Along with an explanation of certain parts of the fault tree, the estimation of significance of certain events is done and the possibilities are considered to eliminate causes of failure or to minimise the consequences of failure.

International Journal of Vehicle Design. -- 2014, v. 64, n. 1, p. 26-45

1. Fault tree analysis 2. FTA 3. Hydraulic power-steering system 4. Industrial light vehicle 5. Methodology 6. Qualitative analysis 7. Rehability

---

2

Modelling and testing of arresting process in flexible vehicle arresting systems [Texto impreso] / Pak Kin Wong, Lap Mou Tam, Yueqiao Chen, Zhengchao Xie

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. 22-23 : 13 refs.

Car bombings have become more prevalent globally; to not only protect people's lives but also avoid the complete destruction of the suspected vehicle, a promising solution is to use flexible vehicle arresting systems, which generally absorb the kinetic energy of the suspected vehicle using energy absorbers and an arresting net. Thus, the vehicle can be arrested safely. According to the existing literature, there is very little theoretical research on vehicle arresting systems and processes. This research is the first attempt at developing an analytical model for the arresting system and process, and for carrying out experimental validation. Based on the model built, a dynamic analysis of the arresting process was also carried out. Experimental and simulated results indicate the model developed is valid, and can accurately predict arresting distance and other safety-related parameters. Therefore, the analytical model proposed can provide a foundation for further study of vehicle arresting systems.

International Journal of Vehicle Design. -- 2014, v. 64, n. 1, p. 1-25

1. Analytical model 2. Computer simulation 3. Energy absorber 4. Flexible vehicle arresting system

---

3

On integral sliding mode control for a unicycle [Texto impreso]/ Jian-Xin Xu, Zhao-Qin Guo, Tong Heng Lee

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. 115-116 : 26 refs.

In this paper we present an integral sliding mode controller (ISMC) that can stabilise an underactuated unicycle system. The unicycle consists of a wheel and a saddle that is modelled as an inverse pendulum. The control objective for a unicycle is to achieve position control of the wheel while keeping the pendulum at the balanced position that is an unstable equilibrium.
The only driving force is the torque applied to the shaft of the wheel. The proposed ISMC consists of an integral sliding surface, a switching term, a nonlinear compensation term and a LQR stabilising controller for the sliding manifold. The ISMC can effectively reject the matched disturbance and reduce the influence from unmatched disturbances, which is verified through rigorous analysis and intensive numerical validation.

International Journal of Vehicle Design. -- 2014, v. 64, n. 1, p. 101-116

1. ISMC 2. LQR 3. Underactuated system 4. Unicycle 5. Vehicle control

---

4

Overview of electric machines for electric and hybrid vehicles [Texto impreso] / K.T. Chau, Wenlong 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. 68-71 : 60 refs.

This invited paper gives an overview of various electric machines for application to Electric Vehicles (EVs) and Hybrid Electric Vehicles (HEVs). First of all, the classification and a brief introduction of EVs and HEVs are presented. Then, viable electric machines that have been applied to EVs and HEVs, including the DC, induction, Switched Reluctance (SR) and Permanent Magnet (PM) brushless types, are reviewed. Consequently, the advanced PM machines that are promising for application to EVs and HEVs are discussed. Finally, the integrated PM machines are introduced, which are essential for future EVs and HEVs.

International Journal of Vehicle Design. -- 2014, v. 64, n. 1, p. 46-71

1. Electric machines 2. Electric motors 3. Electric vehicles 4. Hybrid vehicles

---

5

Simulation and experimental evaluations on the performance of pneumatically actuated active roll control suspension system for improving vehicle lateral dynamics performance [Texto impreso] / Khisbullah Hudha, Zulkiffli Abd Kadir, Hishamuddin Jamaluddin

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. 98-99 : 21 refs.

This paper presents the derivation of a full vehicle model which consists of ride, handling and tyre subsystems to study vehicle dynamics behaviour in the lateral direction. The full vehicle model is then validated experimentally using an instrumented experimental vehicle based on steering wheel input from the driver. Three types of vehicle dynamics test were performed for model validation, namely step steer, slalom and double lane change tests. The validation results show that the behaviours of the model are similar to the real vehicle with acceptable error. An Active Roll Control (ARC) suspension system was developed using the validated full vehicle model to reduce unwanted vehicle motions during steering input manoeuvres such as body roll angle, body roll rate, vertical acceleration of the body and body heave. The proposed controller for the ARC system is a combination of Proportional-Integral-Derivative (PID) control with roll moment rejection loop. The results of the study show that the proposed control structure significantly improves the dynamics performance of the vehicle during step steer, slalom and double lane change manoeuvres compared with a passive vehicle system. The additional roll moment rejection loop is found to be able to further improve the performance of the PID ARC system. The effectiveness of the ARC system with the proposed control was also proven experimentally using the instrumented experimental vehicle.

International Journal of Vehicle Design. -- 2014, v. 64, n. 1, p. 72-100

1. Active roll control 2. ARC 3. Double lane change test 4. Ride and handling model 5. Roll moment rejection control 6. Slalom test 7. Step steer test