Extended Abstract

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Fundamentals of vehicle attribute balancing on electric vehicles

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Abstract:

Engineering criteria and guidelines have been developed and consolidated over the years to develop a good car according to the target market and customer requirements. These receipts worked well with reasonably stable boundary conditions, linear forecast on requirement and customers??? expectations. Moving to the future, looking into the electrification, increased onboard electronics, autonomous driving and connectivity, there will be somehow impact on users??? perception and expectation. While the whole future of mobility is clearly shifting, the need of a fundamental excellence in the dynamic experience is unchanged. There will always be the need for cabin comfort; quietness, temperature control, smooth ride, convenience and safety feeling. All at minimum energy cost. The expectation is indeed increasing. The proposal of this presentation is to discuss the successful vehicle development under the perspective of new energy vehicles. It's about the challenges on application of lightweight strategies, the increased demand on thermal integration, specific components and software integration. It will also be presented the methodologies, test and simulations available to support a good architecture and conscious balance of vehicle attributes. It's about setting cross-attributes balancing as an early development strategy as opposed to a late trade-off decision. Electric vehicles (EV), including Battery Electric Vehicle (BEV), Hybrid Electric Vehicle (HEV), Plug-in Hybrid Electric Vehicle (PHEV), Fuel Cell Electric Vehicle (FCEV), are becoming more commonplace in the transportation sector in recent times. As the present trend suggests, this mode of transport is likely to replace internal combustion engine (ICE) vehicles in the near future. Each of the main EV components has a number of technologies that are currently in use or can become prominent in the future. EVs can cause significant impacts on the environment, power system, and other related sectors. The present power system could face huge instabilities with enough EV penetration, but with proper management and coordination, EVs can be turned into a major contributor to the successful implementation of the smart grid concept. There are possibilities of immense environmental benefits as well, as the EVs can extensively reduce the greenhouse gas emissions produced by the transportation sector. However, there are some major obstacles for EVs to overcome before totally replacing ICE vehicles. This paper is focused on reviewing all the useful data available on EV configurations, battery energy sources, electrical machines, charging techniques, optimization techniques, impacts, trends, and possible directions of future developments. Its objective is to provide an overall picture of the current EV technology and ways of future development to assist in future researches in this sector.

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