

Can a dual clutch be equipped with an energy storage device

Does a dual clutch transmission improve acceleration performance and fuel efficiency?

Abstract: Dual clutch transmission (DCT) which can simultaneously improve acceleration performance and fuel efficiency compared to automatic transmissions (AT) and manual transmissions (MT) is one of the most noted studies in recent powertrain applications.

What is a dual clutch transmission (DCT)?

Dual clutch transmission (DCT) which can simultaneously improve acceleration performance and fuel efficiency compared to automatic transmissions (AT) and manual transmissions (MT) is one of the most noted studies in recent powertrain applications.

Can a two-speed dual-clutch gearbox be used for electric vehicles?

Most electric vehicles today use gearboxes with multiple speeds. The transmission systems on traditional cars using internal combustion engines can be used for electric vehicles. In this paper, the author presents the research result on the gearshift strategy of a two-speed dual-clutch gearbox applied on electric vehicles for energy efficiency.

Does clutch actuator reduce fuel efficiency of DCT-equipped vehicles?

However, much of energy consumption of clutch actuator reduces fuel efficiency of DCT-equipped vehicles. In order to reduce energy consumption of these actuators, a method of modifying mechanism and a method of improving it through control have been studied.

Why does a clutch actuator use a lot of electric energy?

Particularly, when an electric motor is used as a clutch actuator, a large amount of electric energy is required. This requires a large capacity battery, size and load torque on the alternator for electrical generation. Therefore, electric energy consumption is increased compared to AT and MT vehicles.

Does a clutch actuator have a different self-energizing gain?

In particular, clutch actuator of the BR-DCT is modeled to have a different self-energizing gain depending on the sign of clutch torque. Clutch actuator used in this simulation was an electric motor. Power calculation for modeling energy consumption of a clutch actuator using an electric motor is expressed by following equation.

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The main benefits of dual clutch transmissions (DCTs) are: (i) a higher energy efficiency than automatic transmission systems with torque ...

To do so simulation and experimental studies of the shift transient behaviour of dual clutch transmission equipped electric vehicle powertrains is undertaken. To that end a series of power-on and power-off shift control strategies are then developed for both up and down gear shifts, taking note of the friction load

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requirements to maintain ...

Therefore, some studies show a single-motor equipped with a multi-speed transmission can improve the overall efficiency of the powertrain [17], [18], [19], such as clutchless automated manual transmission (CLAMT), continuously variable transmission (CVT), dual-clutch transmission (DCT), and automatic transmission (AT).

In Fig. 3.1, D is the differential mechanism, FG is the reducer with fixed gear ratio, GB is the transmission, M is the motor, and VCU is the vehicle control unit. The HEV powertrain is mainly classified into: series hybrid powertrain, parallel hybrid powertrain and combined hybrid powertrain. The series hybrid powertrain is driven by a motor, and the engine is only used as ...

Hybrid electric vehicles (HEVs) equipped with dual clutch transmission (DCT) can benefit from engine auxiliary braking force and driving motor regenerative braking force in braking conditions. This can effectively reduce the workload of hydraulic mechanical braking systems and recovery braking energy, which will improve the fuel economy.

A selection criteria for energy storage systems is presented to support the decision-makers in selecting the most appropriate energy storage device for their application. For enormous scale power and highly energetic storage applications, such as bulk energy, auxiliary, and transmission infrastructure services, pumped hydro storage and ...

Porsche employed flywheel energy storage in their 911 GT3R hybrid, introduced in 2010. ... Ford is wrapping up a 10-year research project with Samsung SDI in an effort to develop a new dual-battery system that will enable them to implement regenerative braking and idle stop-start on their non-hybrid cars. ... energy storage device (e.g. battery ...

the well-known "dual clutch principle". However we conceived an innovative and improvement to this concept, that enables an electric motor to become an integral part of the transmission. 1. The unit can be either equipped with a 48 Volt, or with a high voltage powerful electric machine (90kW), without any design changes

The DCTs developed by various companies are analyzed below. Figure 5.4 shows Geely wet 7DCT, Fig. 5.5 shows Getrag wet 7DCT, Fig. 5.6 shows AC wet 6DCT and Fig. 5.7 shows Volkswagen wet 6DCT. Through comparative analysis, the WDCT is mainly arranged with 2 output shafts and Getrag DCT adopts 3 output shafts, beneficial to control the matching of ...

One potential renewable energy device to power vehicles is the FC. A FC is an electrochemical device that produces DC electrical energy through a chemical reaction [3] consists of an anode, an anode catalyst layer, an electrolyte, a cathode and a ...

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The introduction and development of efficient regenerative braking systems (RBSs) highlight the automobile industry's attempt to develop a vehicle that recuperates the energy that dissipates during braking [9], [10]. The purpose of this technology is to recover a portion of the kinetic energy wasted during the car's braking process [11] and reuse it for ...

The need for green energy and minimization of emissions has pushed automakers to cleaner transportation means. Electric vehicles market share is increasing annually at a high rate and is expected ...

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The dynamic model of an EV equipped with the proposed gearbox is derived. ... Comprehensive comparisons of popular APU control strategies and different energy storage dispositions are shared, several existing issues are also discussed in this paper. ... into two types, i.e., power-on and power-off [11]. These transmissions with power-on ...

Comparing the proposed DCT with traditional dual-clutch designs, it can be summarized that it has a reduced energy consumption for clutch control. Particularly, in a fairly ...

(a and b) Schematic illustration of three-electrode energy storage device (AC@CC//NiCo₂S₄-x@CC//Zn@CC), (c) The ZIB and ASC were used alternately to calculate the specific capacity by GCD test at 1 A g⁻¹; (d) Specific capacity and Coulombic efficiency of the ZIB with various current densities; (e) Cyclic stability of ZIB at 0.5 A g⁻¹ ...

The elastic energy storage device can be conveniently input energy by hand or motor and become a small capacity of energy source for short duration applications. It can produce a strong impact moment to drive a load with a rapid start because of the spontaneous release of stored energy. ... 4-Clutch mechanism, 5-Clamping-lock mechanism. 3.2 ...

To do so simulation and experimental studies of the shift transient behaviour of dual clutch transmission equipped electric vehicle powertrains is undertaken. ... An investigation of hybrid energy storage system in multi-speed electric vehicle. Energy, Volume 140, Part 1, 2017, pp. 291-306.

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ation. Dual clutch systems from ZF combine the comfort of an automatic transmission with the sporty handling of a manual transmission. The result is a faster, smoother acceleration and superb shifting dynamics.

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A dual clutch system can be used in all passenger cars, especially high-performance vehicles. Dual wet clutch with dual mass flywheel (DMF)

The theoretical energy storage capacity of Zn-Ag₂O is 231 A·h/kg, ... The difference between the fuel cell and other storage device are: 1) fuel cell uses liquid reactants or supply of gaseous for the reactions (Ahmer and Hameed, ... This two-stage system represents a dual-stage converter, in which first stage is the AC-DC converter and the ...

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In conjunction with the issue related to energy production, the intermittency of renewable energy sources is another issue to be considered, from which the necessity to accumulate and store part of the energy produced emerges. Energy storage systems, that can be conceived in several different ways [51], [52], [53], bring with them different ...

Nomenclature ACC Accumulator CBV Counterbalance Valve DP Dual Pressure valve EHA Electro-Hydraulic Actuator EMAS Electro-Mechanical Solution HAS Hydraulic Actuation System LVDT Linear Variable Differential Trans-former PT1 Pressure Transducer PT2 Pressure Transducer V1 Manual release valve V2 Manual release valve 2. ... the system is ...

Photovoltaic semiconductor materials can be integrated with EVs for harvesting and converting solar energy into electricity. Solar energy has the advantages of being free to charge, widely available and has no global warming potential (zero-GWP) which has the potential to reduce GHG emissions by 400 Mtons per year [9] has been reported theoretically that a ...

Finally, depending on the technology used, thermal energy storage systems provide moderate to high energy density and excel at providing efficient temperature control. These systems are critical in solar thermal energy storage, where heat from the sun is captured and stored for a variety of uses such as heating and power generation.

Typically the structure of the hybrid vehicle powertrain consists of two main elements: the primary power source (one-way energy conversion unit) and the secondary power source (bi-directional energy buffer). The storage device provides the ability to recovering brake energy, increase of power in acceleration mode and avoiding engine work in ...

With transmissions consuming approximately four percent of the energy input into the vehicle, improving fuel economy is a key driver for hardware change. As OEMs increasingly offer vehicles with dual clutch transmissions, ...

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Occasionally, EVs can be equipped with a hybrid energy storage system of battery and ultra- or supercapacitor (Shen et al., 2014, Burke, 2007) which can offer the high energy density for longer driving ranges and the high specific power for instant energy exchange during automotive launch and brake, respectively.

Using this approach, Collins et al. developed a lightweight device equipped with a passive clutch mechanism attached to a series spring to augment the ankle torque during push off [19]. Tests ...

transferable torque is the maximum torque the clutch can transfer between the drive and the power take-off side [6]. Fig. 2. Vehicle model 5 Shifting strategy For conventional vehicles equipped with discrete ratio transmissions, e.g. automatic, dual clutch, automated (manual) transmissions, etc., a decision on selecting a

Abstract: In order to improve vehicle fuel economy, an energy management strategy is designed. The model of a plug-in hybrid electric vehicle (PHEV) with dual clutch is constructed by ...

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