A WHEEL MOTOR ELECTRIC VEHICLE BRAKING SYSTEM AND A BRAKING ENERGY RECOVERY CONTROL

The invention discloses a wheel motor electric vehicle braking system and a braking energy recovery control method. Conventional electric vehicle braking system on the size of the braking force is difficult to control, the battery repeatedly charge and discharge, low life. Each wheel is integrated with a motor controller, the motor controller, the planetary reducer and the magnetic powder brake; each wheel motor is controlled by a motor controller; the hub motor is connected with a magnetic powder brake by a planetary reducer, the magnetic powder brake output shaft And the hub is bolted; the ring gear and the reducer housing constitute a rotating vice and connected with the reducer housing through a plurality of electromagnetic actuators; the electromagnetic actuator is connected to the power transmission between the hub motor and the wheel by controlling the ring gear. The method of the invention comprises a braking force distribution process and an energy recovery process. The present invention allocates the feedback power and the non-refueling braking force effectively; the feedback braking force is preferentially used for the automobile electric appliance; when the vehicle is in emergency braking, the ring gear rotates and protects the motor.

Technical field

The present invention relates to the field of electric vehicles, and more particularly to an electric vehicle braking system and a braking energy recovery control method driven by a hub motor.

Background technique

Electric vehicles with its zero emissions, the advantages of environmental protection and energy conservation, in recent years become the automotive industry in the sunrise industry. The application of the wheel motor is to make the electric car's handling beyond the traditional car, and greatly simplifies the car drive system. At present, one of the bottlenecks restricting the development of electric vehicles is that there is still a gap between the mileage of electric vehicles and traditional cars. So how to improve the life of electric vehicles mileage is one of the hot spots in the field of electric vehicles. Electric car on the application of regenerative braking technology will be when the car brake mechanical energy into electricity re-use, to improve the electric vehicle driving range.

At present most of the regenerative braking system is the use of motor reversibility. When the car is braked, the motor is running in the generator state, and the regenerative feedback current generated by the brake is charged into the battery. In the braking force distribution, as the traditional electric vehicles are mostly predecessor or rear drive, can only recover the front wheel or rear wheel of the braking force, can not recover the four wheels on the braking energy.
Second, the traditional electric vehicle braking system in the mechanical brake is often used hydraulic brake. Mechanical braking force size is difficult to achieve high-precision control, resulting in feedback and braking force and the allocation of mechanical braking to achieve more difficult.
Again, in the need to frequently start the brake city traffic, the battery repeatedly charge and discharge, so that battery life greatly reduced. Recycling a small amount of electricity, but damage the expensive battery, more harm than good. In response to this problem, some designers to the braking system to add a super capacitor, used to temporarily store energy, but the super capacitor price than the same energy storage lithium battery prices ten times higher, very expensive. Moreover, the additional super capacitor adds the weight of the electric car, so that the driving range is reduced.
Not only that, when the car is in extreme conditions of emergency braking, the feedback current is too large and may burn the motor. The traditional brake energy recovery system is not designed to effectively protect the structure and measures of the motor in extreme conditions.

The contents of the invention

The aim of the present invention is to provide a safe, economical and efficient method for controlling the braking system and the braking energy of a wheel motor electric vehicle for the shortcomings of the regenerative braking system of the wheel motor electric vehicle.
The hub motor electric vehicle braking system of the invention comprises a braking device and a control system. The brake device comprises a hub motor, a motor controller, a planetary reducer, an electromagnetic actuator, a magnetic powder brake and an onboard lithium battery; each wheel is integrated with a hub motor, a motor controller, a planetary reducer and a magnetic powder brake; Wherein the motor controller is fixed on the frame and the stator of the hub motor is fixed on the frame, each of the hub motors is controlled by a motor controller; the hub motor is connected with a magnetic brake by a planetary reducer, the output shaft and the hub of the magnetic powder brake Bolted. The planetary reducer comprises a ring gear, a reducer

housing and an electromagnetic actuator. The reducer housing is supported on the input shaft of the magnetic powder brake of the magnetic powder brake by a bearing; the ring gear and the reducer housing are rotatably connected with the reducer housing through a plurality of electromagnetic Actuator connection.

The magnetic powder brake is composed of a yoke, an excitation coil, a rotor, a magnetic powder, a board shoe, a rear end cover, a bearing, a front end cover, a magnetic powder brake input shaft and a magnetic powder brake output shaft. The two ends of the input shaft of the magnetic powder brake are respectively supported on the reducer housing and the front end cover of the planetary reducer through a bearing; the one end outer spline of the output shaft of the magnetic powder brake is connected with the inner spline of the input shaft of the magnetic powder brake, The rotor wheel is connected with the frame, the output end of the magnetic powder brake is supported on the rear end cover through the bearing; the rotor and the shoe are arranged between the front and rear cover; the rotor is fixed on the input shaft of the magnetic powder brake; The shoe is a ring structure, fixed on the rear cover, and the rotor coaxial set, and with the rotor radial gap filled with magnetic powder. The yoke is located outside the rotor and has both ends fixed to the front and rear ends respectively.