FEATURES OF WHEELED VEHICLES WITH HYBRID AND ELECTRIC DRIVES FOR DRIVE WHEELS

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The development of vehicle design is aimed at improving efficiency, environmental friendliness, cost-effectiveness, reliability, and safety, which increases the role of electric drives and electronics [1]. Modern hybrid and electric vehicles combine traditional solutions with advanced technologies, having structural and functional features that distinguish them from vehicles with internal combustion engines (ICEs).

Among the structural features: electric motors that can drive individual axles or be integrated into wheel hubs, allowing for the elimination of traditional transmissions; power units are compact and modular, providing more interior space [2, 3]; batteries located in the vehicle floor lower the center of gravity and improve stability and handling.

Among the energy-related features: regenerative braking improving motion efficiency [4]; the use of batteries as the main energy source requiring cooling and effective energy management; in hybrid vehicles, the combination of ICE and electric motor reduces fuel consumption, harmful emissions, and improves dynamics.

Functional features include: improved acceleration and smooth operation due to the instant torque of the electric drive; low noise levels, enhancing comfort, especially in urban environments; reduced maintenance costs due to the absence of many mechanical components.

Environmental and operational advantages include: zero or minimal emissions, which is important for urban areas; lower operating costs due to cheaper electricity; easy integration with smart control systems and autopilots.

Among the disadvantages: limited power reserve and dependence on a network of charging stations; high cost of electric drives and batteries, increasing the vehicle price; environmental risks in battery production, despite clean operation.

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