Supercapacitor Assisted Hybrid Electric Vehicle Powertrain and Power Selection Using Fuzzy Rule-Based Algorithm

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Heavy electric vehicles vary their power demands due to frequently varying loads. The research proposes an applied fuzzy logic algorithm for the acceleration strategy of supercapacitor-assisted electric vehicles, which selects the appropriate power source based on the vehicle power demand in real-time. The algorithm determined the supercapacitor cutoff phase within 200 milliseconds using the developed 1/6 scale test vehicle system during the initial vehicle acceleration based on the peak current and current slope. The system reduces battery stress by limiting transient power, improving the hybrid powertrain's longevity and efficiency.

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