

Application of Hybrid Energy Storage System in Medium-Low Voltage DC Distribution Network

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Abstract

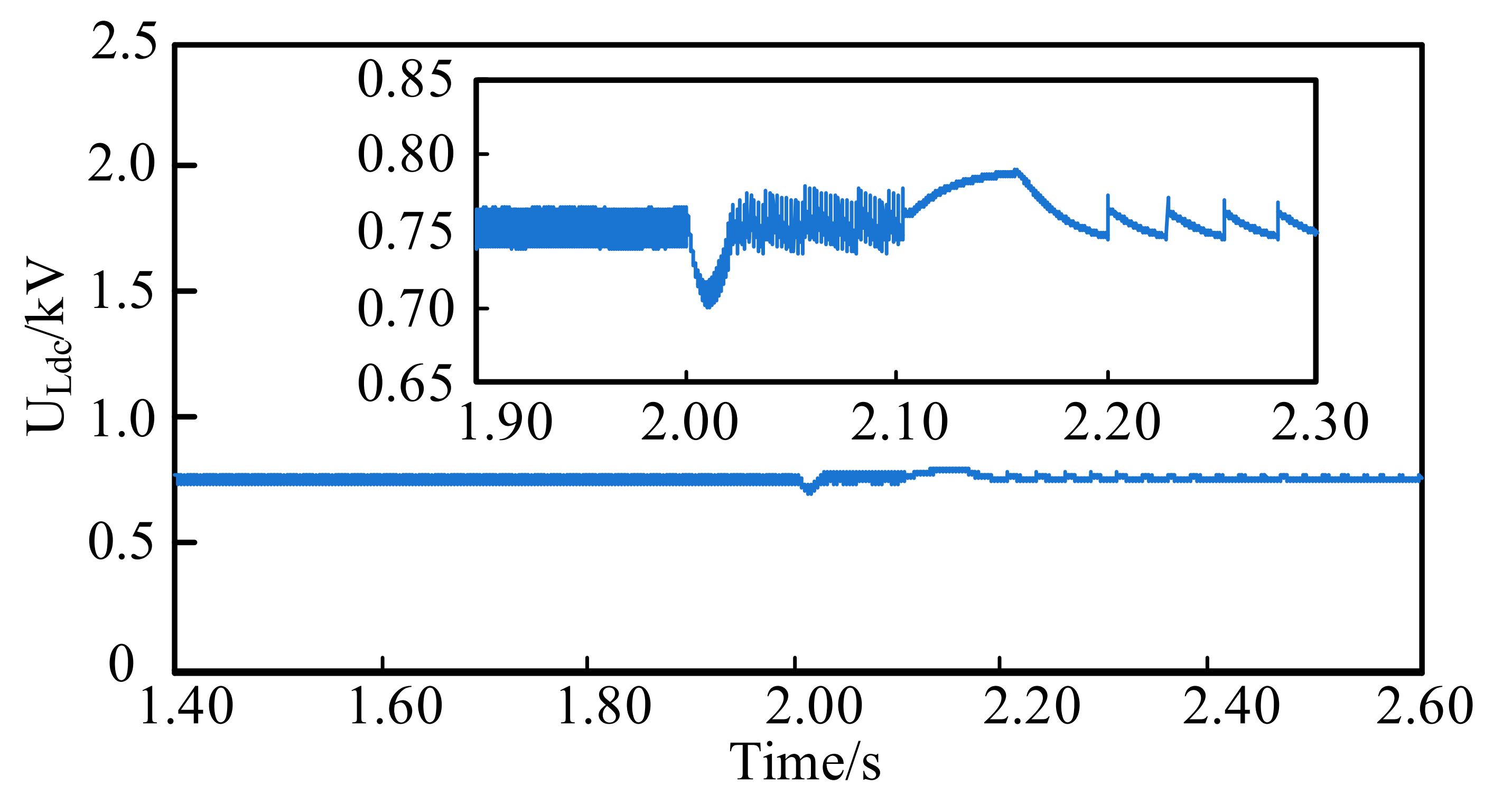
Taking the differences in the energy storage characteristics of super-capacitors and batteries into account, an uninterruptible power supply application mode and multi-mode partition control strategy for hybrid energy storage devices are proposed, which can reduce the dynamic response time of medium and low voltage DC distribution network under the condition of superior power failure.

Methods

When the medium voltage DC bus or PET fails and the PET is blocked, HESS enters the discharge state to maintain the stability of the DC bus voltage on the low voltage side and the DC load supply.

When a fault occurs on the low-voltage DC side, in order to avoid the hybrid energy storage device serving as the second power source to feed current to the fault point, the hybrid energy storage device should be blocked.

Results



It can be seen that the low-voltage DC voltage drops with the blocking of PET. The super capacitor DC / DC starts constant voltage control. The DC voltage is restored to the rated value within 20 ms, and the voltage drop does not exceed 7%.

Conclusions

Based on the analysis of the operation mode of the medium-low voltage DC system and the control characteristics of the hybrid energy storage system, a three-layer control network architecture and multi-mode partition control strategy are proposed.

