

# A Pilot Protection Scheme Based on High-frequency Transient Current Waveform Similarity for AC Lines Connected to HVDC Inverter Station

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## Abstract

Affected by inverter fast control and commutation failure, most protection schemes for AC lines connected to LCC-HVDC inverter station(ACLs) have the problems of complex setting, weak anti-noise and high demand for data synchronization. This paper proposes a pilot protection scheme based on high-frequency transient current waveform similarity. Firstly, with analyzing the fault traveling wave propagation process, the obvious differences are found in the transient current waveforms at both ends of the line when internal and external faults occur. Then the similarity of transient current waveforms is measured with the improved longest common similar subsequence (LCSS) method. And the weak high-frequency current is extracted with the improved synchronous squeezed S-transform (SST) method. Finally, a large number of PSCAD simulation results show that the proposed protection method does not require strict data synchronization, has strong anti-noise performance, and is tolerant to the influence of abnormal point fluctuations.

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