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A Review on Adaptive Relaying Strategies for Power System Protection Optimization

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Abstract: *Modern power systems are increasingly complex due to the integration of renewable energy sources, distributed generation, smart grids, and flexible transmission systems. These changes challenge conventional protection schemes that rely on fixed settings and predetermined fault conditions. Adaptive relaying has emerged as an effective strategy to enhance the reliability, selectivity, speed, and sensitivity of power system protection. This review paper presents a comprehensive analysis of adaptive relaying strategies, their operating principles, communication requirements, optimization techniques, and practical implementation challenges. The study critically reviews traditional protection limitations, explores intelligent and communication-assisted adaptive relays, and highlights future research directions for protection optimization in evolving power networks.*

Keywords: Adaptive Relaying, Power System Protection, Intelligent Relays