

Learning-based strategy for reducing the multiple estimation problem of fault zone location in radial power systems

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Abstract-

A learning-based strategy that uses support vector machines and k nearest neighbours is proposed for locating the faulted zone in radial power systems, specifically in distribution networks. The main goal is to reduce the multiple estimation of the fault location, inherent in those methods that use single end measurements. A selection of features obtained from the fundamentals of voltages and currents, measured at the power substation, are analysed and used as inputs of the proposed zone locator. Performance of several combinations of these features considering all fault types, different short-circuit levels and variation of the fault resistance, and the system load is evaluated. An application example illustrates the high precision to locate the faulted zone, obtained with the proposed methodology. The proposal provides appropriate information for the prevention and opportune attention of faults, requires minimum investment and overcomes the multiple estimation problem of the classic impedance based methods.

Index Terms- Fault diagnosis , learning (artificial intelligence) , power distribution economics , power distribution faults , power system analysis computing , support vector machines

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