International Journal of Electrical Power & Energy Systems. Volume:53 Number: Pages: 733-741. December 2013

MCHO - A new indicator for insulation conditions in transmission lines

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Abstract— Conventionally monitoring operating conditions of a power transmission line is accomplished by periodic inspections along this line. This monitoring allows corrective maintenance by finding faults during the inspection. But in more efficient maintenance, predictive techniques that are characterized by real-time monitoring should be employed. Such predictive techniques allow for verifying the working status of the line by using normal working models to detect faults and fault models for diagnosis. This paper presents a study that used a mathematical model appropriate for application to predictive maintenance of transmission line segments at low cost, without the need for sensors distributed along the line, and presenting a new indicator of transmission line operation conditions. By tracking the leakage current of transmission lines, this model allows for estimating the current line insulation status. Once the current line insulation status is known, it is possible to compare it against other future status and verify the progress of the insulation conditions of that line. The model uses a new indicator, called MCHO, which can detect and diagnose both normal and abnormal operating conditions of a power transmission line. This new indicator is the capacitance of the harmonic frequencies of the transmission line leakage current. The model was validated through measurements obtained on a stretch of transmission line.

Index Terms— Leakage current; Capacitance; Permittivity; Transmission line; Detection and diagnosis

Citation:
Max L.C. Negrão, M.; N. da Silva, P.R.; Gomes, C.R.; Gomes, H.S.; Vieira Junior, P.; Sanz-Bobi, M.A.; "MCHO - A new indicator for insulation conditions in transmission lines", International Journal of Electrical Power & Energy Systems, vol.53, no.,

pp.733-741. December, 2013.