Turkish Journal

of

Electrical Engineering & Computer Sciences

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Turkish Journal of Electrical Engineering & Computer Sciences

Determining wave propagation characteristics of MV XLPE power cable using time domain reflectometry technique

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Abstract: In this paper, the wave propagation characteristics of single-phase medium voltage (MV) cross-linked polyethylene (XLPE) power cable are determined using time domain reflectometry (TDR) measurement technique. TDR delivers the complex propagation constant (attenuation and phase constant) of lossy cable transmission line as a function of frequency. The frequency-dependent propagation velocity is also determined from the TDR measurements through the parameters extraction procedure. The calibration of the measuring system (MS) is carried-out to avoid the effect of multiple reflections on the accuracy of measurements. The results obtained from the measurements can be used to localize the discontinuities as well as the design of communication through distribution power cables.

Key Words: Cross-linked polyethylene, distribution power cables, time domain reflectometry, propagation constant, attenuation constant, phase constant, propagation velocity

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Turk. J. Elec. Eng. & Comp. Sci., **19**, (2011), 207-219.
Full text: pdf
Other articles published in the same issue: Turk. J. Elec. Eng. & Comp. Sci.,vol.19,iss.2.