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**INPUT IMPEDANCE CHARACTERISTICS AND MODELING OF LOW-VOLTAGE RESIDENTIAL
INSTALLATIONS FOR LIGHTNING STUDIES**

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Abstract - The overvoltage level of a system is strongly dependent on the connected loads and for more precise models, better and more reliable simulation results are obtained. Nevertheless, there is a lack of publications focusing this topic, because usually the loads, or connected equipment, are usually represented by simple resistances or capacitances. This paper presents the input impedance characteristics, over a wide range of frequencies, of various typical low-voltage residential installations. The measured frequency responses of real installations are fitted and modelled by simple, but effective RLC networks that can be used in any software for transient simulations. Despite the discrepancies in the frequency response behaviour among the installations a general model is proposed. The range of frequencies, up to 5 MHz, allows the use of these models considering lightning or switching studies. The paper also includes simulation responses of a low-voltage distribution network subjected to lightning surges.