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Computer Simulation Evaluation of an Electric Current Impulse generator

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The lightning are natural phenomenon of extraordinary complexity that has significant influence on life on Earth in many ways. Discharges cause risk of potential effects on the safety of living beings and are capable of causing damage to the integrity and operation of electric power and communications systems. Therefore, many researches are focused to understand the phenomenon, but there is some difficulty in working directly as it occurs in nature. Thus, alternatives used to study lightning are either by computer simulation or by simulation from capacitor discharges. By exposed, this paper presents a computer simulation of a simulator of lightning, better known as current impulse generator. Resistor, inductor and capacitor (RLC) represents the electric circuit of generator. Moreover, it was considered that generator consists of three capacitors in parallel and test object to impulsive current injection is a grounding grid represented by its earthing resistance. Then, with the objective to evaluate the response of the simulated event, it was used the variable capacitance, inductance, capacitor charging voltage and ground resistance such that they obtain different current curves as a function of the generator discharge time. The simulations were performed with four different configurations of impulse generator and each variable was used separately while the others were held constant. The evaluated parameters were amplitude, front time and half-wave time of the current signal generated in the test object. As a result it was observed that: the charging voltage had no significant influence on the variation of front times and half-wave times of generated signal; raising the capacitance caused no significant variation in the magnitude of the current; the higher the inductance, the lower the front time of the injected current; and the amplitude of the applied current vary significantly when it was changed the resistance value of the simulated ground system.

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