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## Design-implementation procedure of impulse voltage generators

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Power distribution and transmission devices can be exposed to voltage transients such as switching and lightning impulse voltages. Usually, impulse voltage withstand tests should be performed in order to reduce the risks of equipment failure. This raises the importance of generating high voltage impulses that make these tests conceivable. For each application, different type of testing waveform is required. These waveforms are defined by specific parameters including the duration, pulse width and raising time among others. Those parameters were partially standardized to organize and regulate different experimental data obtained from various investigations worldwide. In this study, the design aspects of a single-stage standard impulse voltage generator with desired voltage level and output waveform characteristics are detailed. The proposed approach maps the stated literature in ["An Introduction to High Voltage Engineering" by RAY S; "Impulse Testing of a Polluted Insulator with a Dc Bias Voltage" by Shifidi, S K *et.al.*, and so on] into a permissible implementation, in which none of the used components has to be especially built for this purpose. That decreases both the implementation time and cost. Moreover, a verified example on the design of a mobile, low-cost 30 kV standard [1.2/50 μSec] lightning impulse voltage generator is implemented and tested. The validity of the design approach has been conducted both by experiments and simulations with the aid of the Pspice simulation environment in accordance with Kamarudin *et.al.* This study shows that, the usage of alternating high voltage input (HVAC) with voltage-multipliers that rectify and increase the voltage into a desired level of direct high voltage (HVDC) can be used to trigger a single-stage impulse generator circuit configuration. This approach can be considered as a solution of the accumulated inaccuracies of each stage of multi-stage impulse voltage generators. The overall work results in a mobile, easy to build, low-cost and accurate impulse generator that can eliminate the need of the high cost commercial impulse generator products.

### Biography

Mohamad Harastani received the BS degree in Electrical and Electronic Engineering from Eastern Mediterranean University (EMU), Northern Cyprus, and currently pursuing the MS degree in Electrical and Electronic Engineering with EMU. His research interests are in the general areas of systems' topology, duality and analogy with applications to robotics and electrical circuits, high voltage engineering and numerical electromagnetics.

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