Simulink model for the pulse voltage generator 7 MV, 560 kJ

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The problem of protecting electrical equipment from atmospheric overvoltage requires improvement of the technology of conducting HV tests. In addition to improving the classical test methods (pulse wave shape in accordance with IEC/TR 62066:2002), it is necessary to resort to new test possibilities that relate to the shape of the tested voltages. As a rule, pulse voltage generators (PVG) operating on the Marx voltage-multiplying circuit are used to obtain pulse test voltages. One of the most powerful PVG with a total charging voltage of up to 7 MV, stored energy up to 560 kJ is located on the territory of SPbPU. The setup is designed for all areas of HV testing equipment, including studies of the insulation strength of various electrical equipment, aimed at creating and calculating the dimensions of insulating sections and determining the insulating capabilities of equipment [1]; studying the conductive properties of soil with electrodes of lightning protection devices placed in it [2]; testing of load-bearing structural elements of aircraft for lightning resistance [3]. In this paper, the SPbPU PVG model in the Simulink package is proposed. The main aim of the study is to obtain the specified characteristics of the pulse voltage via numerical simulation, which brings subsequent tests closer to the full-scale effects oflightning and increases the reliability of the results obtained.

[1] Luo S, Luan L, Cui Y, Xu S, Guo Q and Liu T 2021 *Journal of Physics: Conference Series* **1802** 042020
[2] Fortov V E, Smirnov V P, Son E E, Bykov Y A, Grabovskii E V, Gribov A N, Oleinik G M and Savel'ev A S 2015 *High Temperature* **53** 775–778
[3] Korovkin N, Adamyan Y and Minevich T 2018 *Transportation Research Procedia* **36** 320–325