HIGH-POWER ELECTRICAL PULSE WITH LOW HARMONIC DISTORTION FORMING METHODS FOR DYNAMICAL AND EMC TESTING

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With the growth of the power of electronic power-switches and the speed of current control, the energy, electric transport, industry and other areas using powerful electrical converters are rapidly developing. However, the pulsations of electric and magnetic fields exceeding the limits can have a negative impact on both living organisms and nearby equipment. Therefore, an important stage in the research of these converters and power transistors is the testing of their maximum characteristics and environmental impact studies when the converters operate in nominal and maximum operating modes. The main challenges associated with testing these converters are the reduction of sufficiently small parasitic inductances and internal resistances in the circuit, the suppression of overvoltages and overloads, the maximization of the linearity of the parameter changes over time and the repeatability of all measured parameters. In the course of this research, mathematical models were created and two different circuits forming regular current pulses were practically tested. Minimized inductances and internal resistances of components allowing to achieve the real dI/dt speed of the electronic power switch. Also, the maximum generated electric, magnetic and electromagnetic fields at various distances from the source were investigated.