



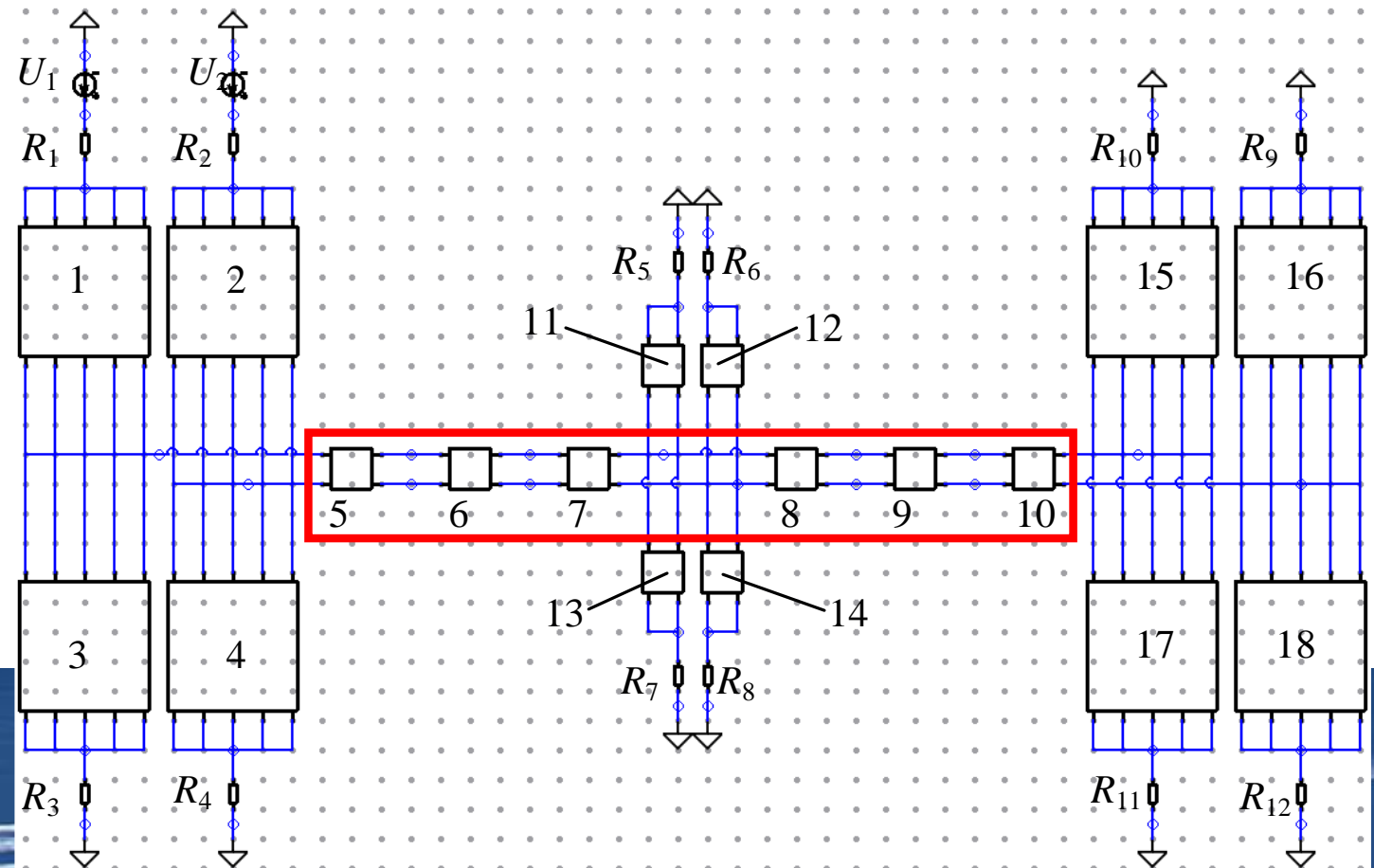
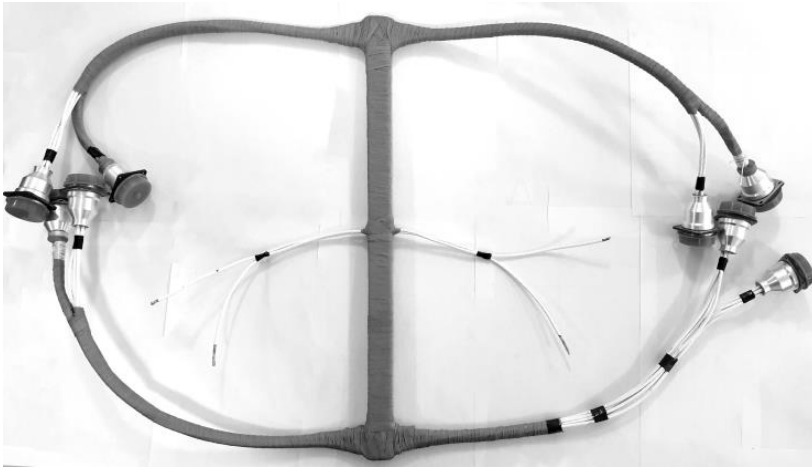
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«MIST: Aerospace - 2020: Передовые технологии в  
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Minimization of the Differential Mode Pulse Interference in the  
Spacecraft Power Supply Bus by Varying Its Length using Genetic  
Algorithm

Rustam R Gazizov,  
Ruslan R Gaizov,  
Timur T Gazizov,  
Mariia N Kalinina

# Relevance

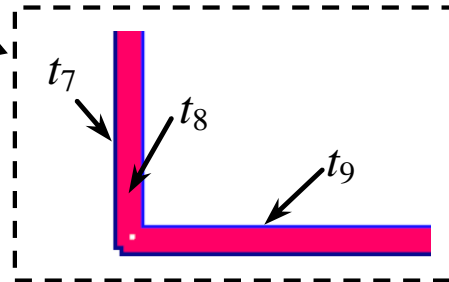
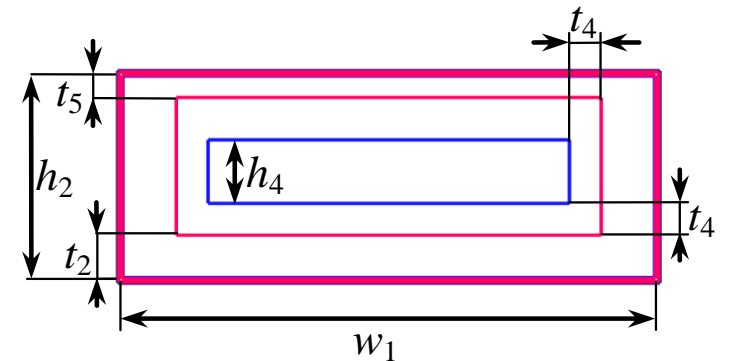
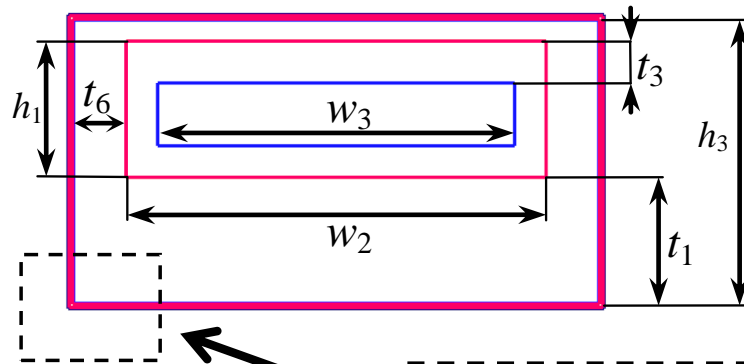
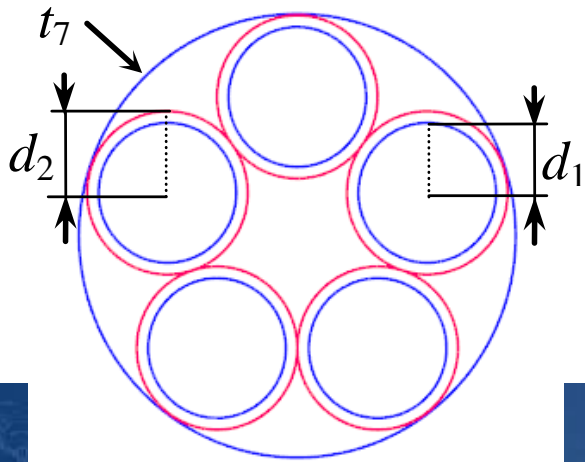
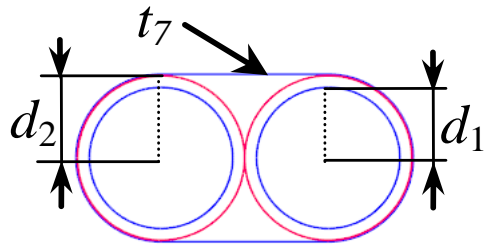
The aim of this work is to optimize the length of MCTL sections of a PS bus to minimize the voltage maximum, and to investigate the influence of the number of chromosomes and populations of GA on the results of optimization.



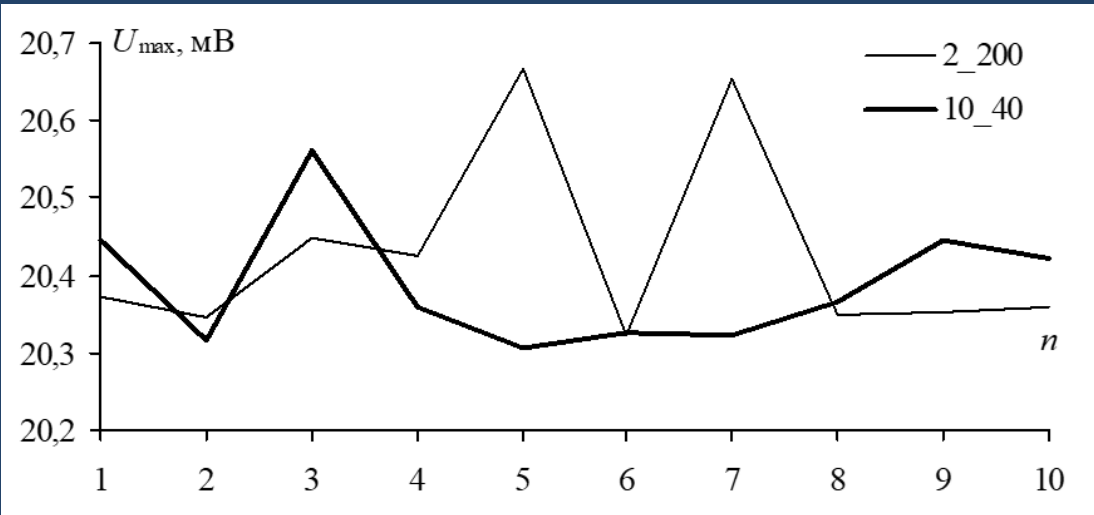
# Solution method

The differential-mode excitation of a trapezoidal pulse, where  $U_1$  has an amplitude of the electromotive force equal to 100 V and  $U_2$  – minus 100 V was taken for investigation. The rise time equal 1 ns, a flat top equal 10 ns and fall time – 1 ns. The GA parameters were the following: the mutation coefficient was 0.1; the crossover coefficient was 0.5.

The lengths of the MCTL sections 7 and 12 were assigned variables  $l_1$ , the MCTL sections 8 and 11 –  $l_2$ , the MCTL sections 9 and 10 –  $l_3$ . The variables ( $l_1, l_2, l_3$ ) were changed in the range from 0.01 m to 0.5 m in the process of optimization. In this way, the general length of the PS bus ( $l$ ) is defined as  $l=2(l_1+l_2+l_3)$ .

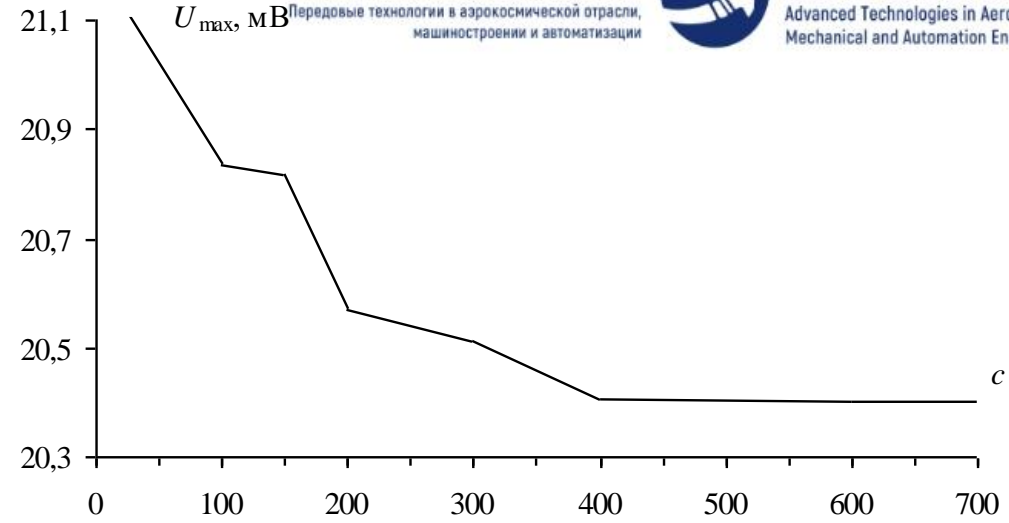


# Conclusion

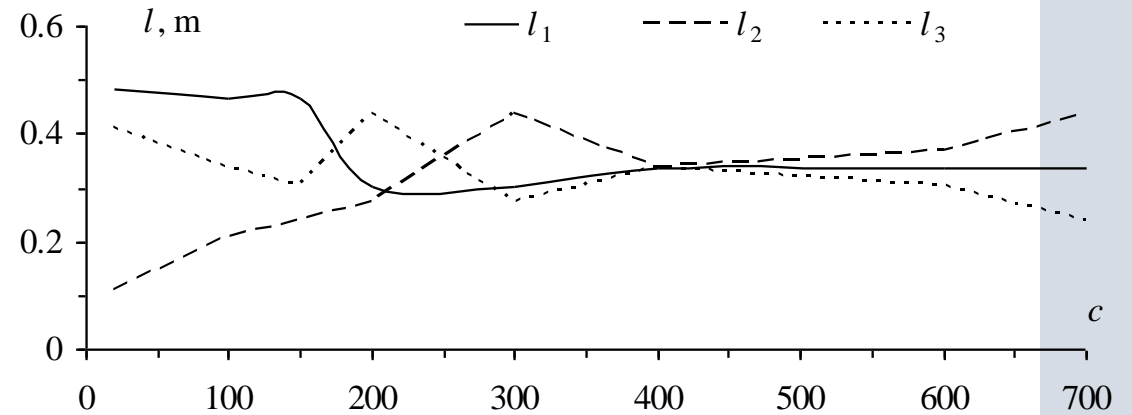


The dependence of the maximum voltage values on GA run with different GA calculations

It is shown that using optimization we managed to decrease the voltage maximum amplitude by 270 times.



The dependence of the voltage maximum on the number of GA calculations



The dependence of GA variables on the number of calculations

# Контакты

Газизов Рустам Рифатович

НИУ ВШЭ

[gazizovtsk@yandex.ru](mailto:gazizovtsk@yandex.ru)

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