

## **Method for calculating the current transformer saturation time using piecewise linear approximation of the average magnetization curve.**

*Budovskiy V. P., Vorobjev V. S., Ivanchenko A. N., Moskalenko V. V., Rasshcheplyayev A. I., Rybalkin A. D.*

A new, more accurate method of calculating the time to saturation of the current transformer (CT) is being considered. For the case of a linear relationship between the magnetic induction  $B$  and the magnetic field strength  $H$ , the authors obtained analytical expressions for  $H(t)$  and  $B(t)$  as a result of solving the well-known system of nonlinear equations describing the processes in CT. For the practical use of these expressions, it is proposed to use piecewise linear approximation (CLA) of the average magnetization curve. The algorithm for the optimal CLA and the algorithm for calculating the time to saturation of the CT are described in detail. The algorithms are implemented in the form of computer programs, the performance of which, as well as the adequacy of the obtained analytical expressions, are confirmed by numerical experiments.

*Key words: measuring current transformer, magnetizing current, saturation time, short circuit phase, average magnetization curve, piecewise linear approximation.*