

Program algorithm for inductive component correction in fast pulse heating experiments

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In experiments with fast pulsed resistive heating to study the thermophysical properties of materials at high temperatures, it is necessary, in particular, to determine the resistive voltage drop at the ends of the sample as accurately as possible. The problem is that since the voltage measurement circuit includes a sample, measuring probes and voltage divider conductors, when a strong heating current flows through the sample, an induced electromotive force is generated. During the experiment, when the current through the sample rapidly changes at the beginning and end of the pulse, a “parasitic” inductive voltage interference occurs in the measurement circuit, which can be observed in the graphs of the measured experimental voltage data. This interference distorts the experimental data and leads to unacceptably large errors during current switching. For these reasons, algorithm and computer program were developed to correct the inductive component of the voltage arising in the measuring circuit. In this work, a unique voltage correction algorithm is presented. The results of the program for correcting the voltage in the measuring circuit are also presented. The developed program allows one to determine the actual value of circuit inductance for each set of experimental data, taking into account the contribution in each experiment. The new algorithm was used to process the obtained data on titanium and niobium carbides at high temperatures and melting point.

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