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Measurement Uncertainty of Fast Pulse Voltages Measurements with Capacitive Divider

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The influence of measurement uncertainty of type A and B as well as combined uncertainty during the measuring of fast pulses by using capacitive divider will be considered in the paper. A budget of measurement uncertainty will be formed for that purpose, the one that is characteristic for measuring fast pulses with a capacitive divider. Several types of capacitive dividers will be designed and used (with different types of high-voltage capacitor, low-voltage capacitor and with adjustable resistance) that provide minimization of certain measurement uncertainty budget components. Measuring of pulse voltages under well-controlled laboratory conditions will be performed for each type of capacitive divider. The parameter of these experiments will be pulse rising time (in the ranges of ms, μs, ns). Measuring results will be processed statistically. On basis of the obtained results, it will be possible to conclude which components of the voltage divider (construction, materials, capacitance, inductivity etc.) influence the measurement uncertainty. It will enable recommendations for choosing the optimal type of capacitive divider in accordance with minimal measurement uncertainty.

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