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Full elimination of nonlinear effects in a Constant Voltage Anemometer[1] GENEVIÈVE COMTE-BELLOT, ARGANTHAËL BERSON, PHILIPPE BLANC-BENON, Ecole Centrale de Lyon — A procedure for the elimination of all nonlinearities in a Constant Voltage Anemometer (CVA) has been developed which is easily implemented on a PC when post-processing experimental data. It relies on (1) the first-order differential equation governing the CVA circuit, (2) the first-order differential equation describing the hot-wire response and (3) the algebraic equation corresponding to the calibration law. In practice, the method is adapted to any length of the connection cable between the hot wire probe and the CVA and only requires the extra measurement of the time constant of the hot wire using an embedded square-wave test. The present procedure aims at replacing previous data-processing methods that were mostly based on linearized equations. The two main features of the CVA, i.e. a constant bandwidth and a rapid adjustment of the hot-wire operation in the cold and hot modes to take into account temperature drifts of the incident flow, still hold when using the present method. Benefits of the new procedure are demonstrated for higher order odd moments of turbulence (skewness factors).

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