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Fitting transducer characteristics to measured data

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Abstract: There are no rules to select the best curve-fitting method for a given set of data. This problem is of great importance in measurement applications. Optimizing analog and digital methods for a transducer's characteristic interpolation or linearization is a field where constant research is being done, particularly since auto-calibration and self-test of intelligent transducers is a topic of major interest. We present an overview of classical methods for data interpolation and least mean squares regression. We make a comparative evaluation of the relative performance of polynomial and artificial neural networks approximations to measurement data with particular attention paid to the reduction of the required calibration set dimension to obtain a given accuracy.

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Calibration

Calibration is defined by the International Standards Organization (ISO) as:

the set of operations which establish, under special conditions, the relationship between values indicated by a measuring instrument or measuring system, or values represented by a material measure and the corresponding known values of a measurand [9], [20], [21].

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