

Measurement systems as dynamic systems

Measurement systems *respond* to the quantities measured. This response is crucial to our interpretation of a measurement reading. For instance, a thermometer does not give instantaneous measurement; rather, we wait for the response to “settle” before taking a reading. However, time delay is only one way in which the measurement system response affects the reading. More complicated effects require further analysis.

response

System dynamics is a field devoted to such system analysis by representing systems with *mathematical models*. Specifically, we will consider *lumped-parameter models* of measurement systems. These models give insight into the measurement system’s behavior and allow us to properly design measurement systems and interpret their readings. Modeling does not replace calibration, but complements it.

system dynamics

mathematical
model
lumped-parameter
modeling