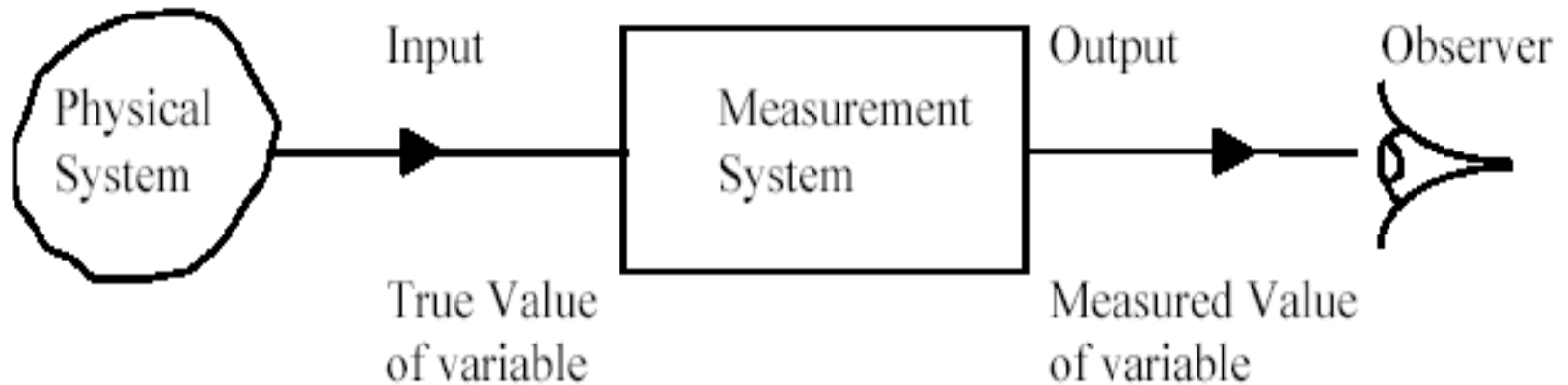
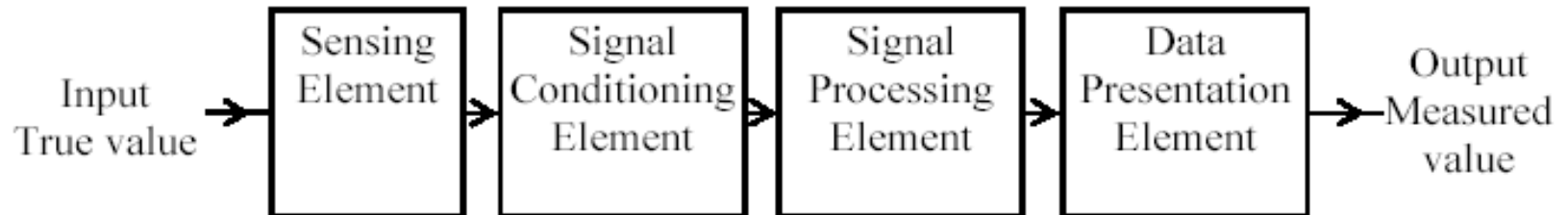


# Transducer Characteristics

# Measurement Systems



# Measurement Systems



# Transducer Classification

- A *Sensor* is a transducer designed to produce measurement information.
- An *Actuator* is a transducer intended to convert energy to be used in a control or test application.

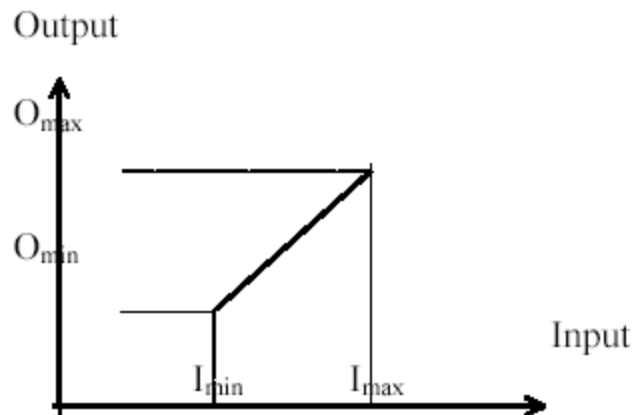
# Transducer Classification

- In a *Passive* transducer, a change in the measurand produces a change in a related parameter. It requires an external source of power for operation. Also known as a *parametric* transducer.
- In an *Active* transducer, input energy is directly converted into the output form. No external power source is required.

# Transducer Classification

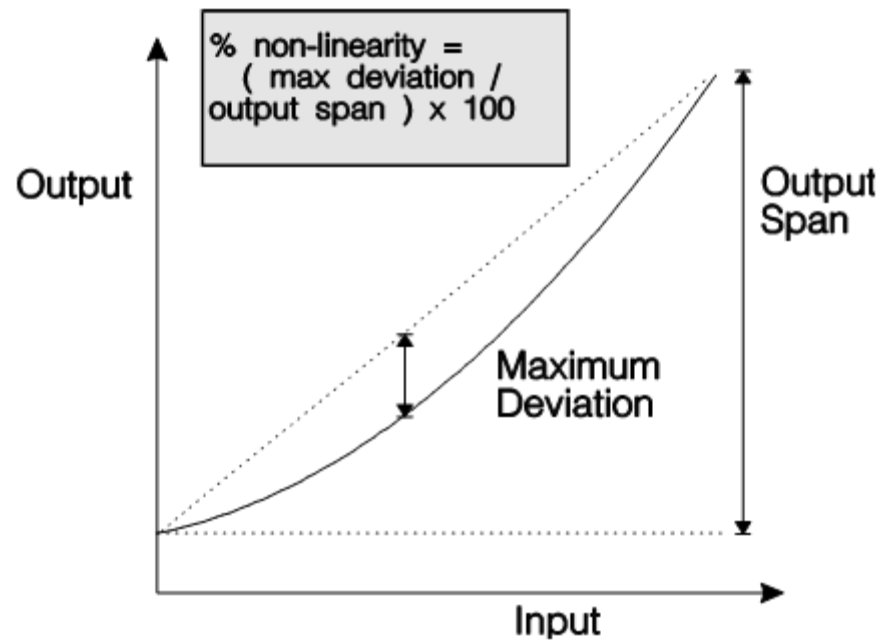
- An *Analogue* transducer produces an output whose size is proportional to the value of the measurand.
- A *Digitising* transducer is a counting device. The output is the number of “events” observed, e.g. photons, radioactive decays, etc.

# Range and Span



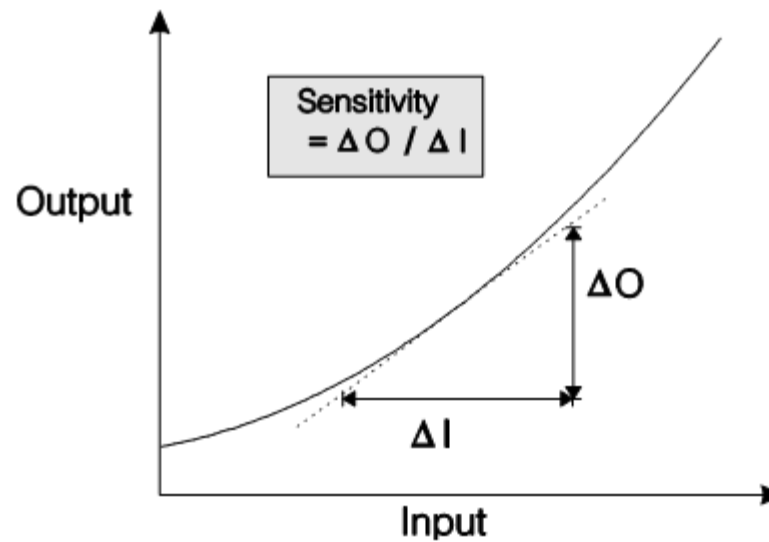
- Input *range* defined by  $I_{min}$  and  $I_{max}$ .
- Input *span* defined as  $I_{max} - I_{min}$
- Output range and span defined similarly.

# non-linearity

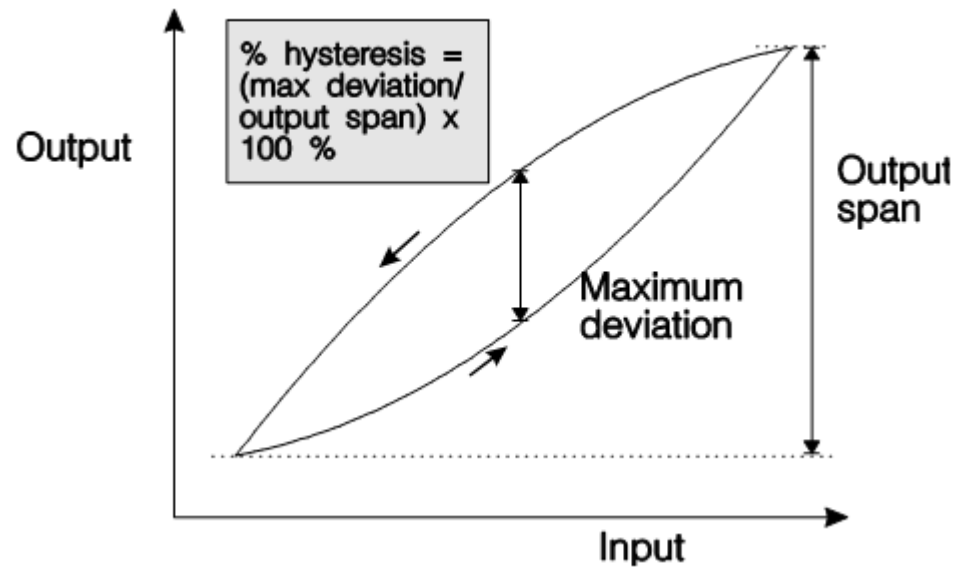




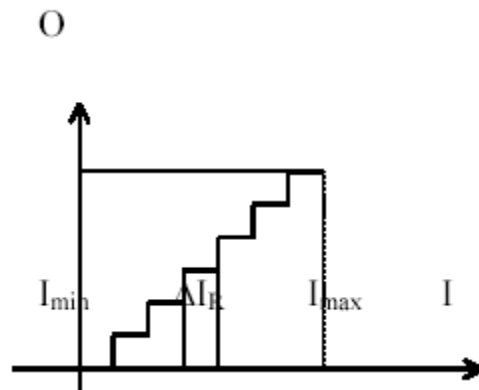
# sensitivity



# hysteresis

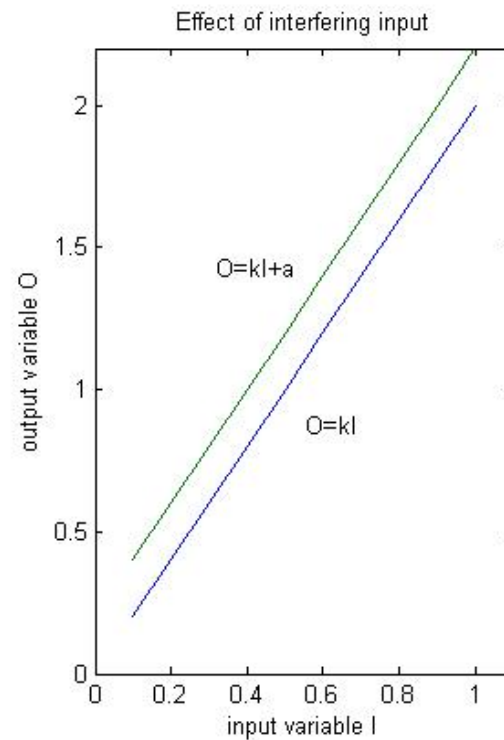
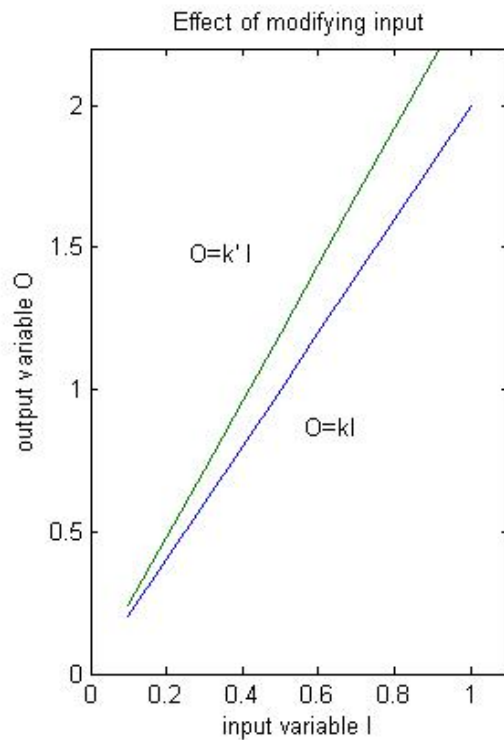


# Resolution



- The resolution of the device is the smallest detectable change in input.
- Some devices have an intrinsic step response,
- Some may be noise limited,
- Others are limited in practice by the resolution of A/D electronics (more later).

# Interfering and modifying inputs



# Accuracy and precision

