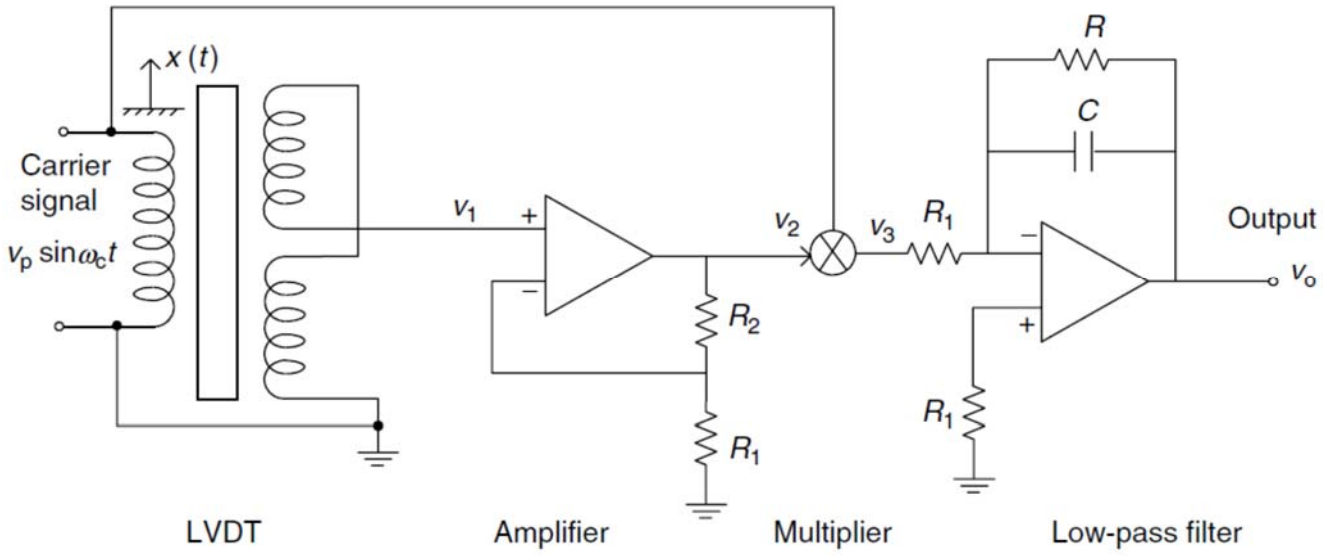
Signal Conditioning:

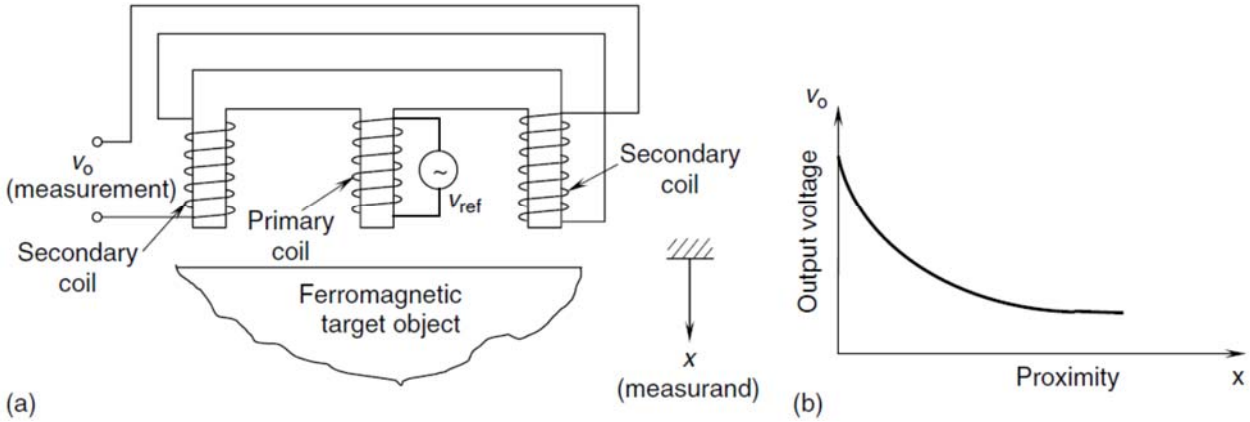
- Signal Amplification – increase signal strength so we ca interpret it.
- Filtering – need exactly the signals we require for interpreting it properly.
- Improving SNR – filter out unwanted so actual signal quality is better and Noise (unwanted) signal is suppresses.

Example:
Figure shows a schematic diagram of a simplified signal-conditioning system for an LVDT.



See LVDT Example for more details.

Mutual Induction Proximity Sensor:



- Displacement transducer also operates on the mutual-induction principle.

- The insulating ***E-shaped*** core carries the primary winding in its middle limb. The two end limbs carry secondary windings, which are ***connected in series***. Unlike the LVDT and the RVDT, the two voltages induced in the secondary winding segments are additive in this case.

- Proximity sensors are used in a wide variety of applications pertaining to non-contacting displacement sensing and dimensional gaging. Few applications are:

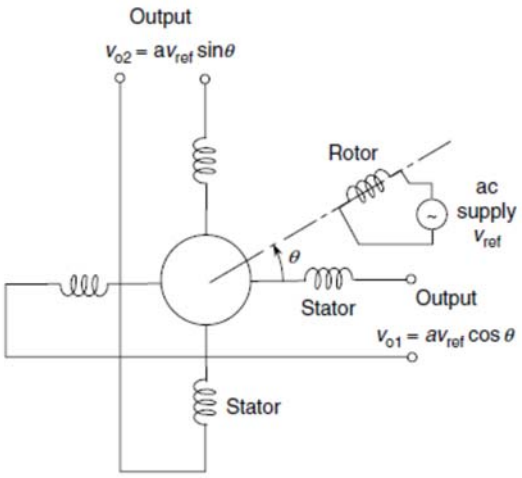
    - Measurement and control of the gap between a robotic welding torch head and the work surface.

    - Gaging the thickness of metal plates in manufacturing operations (e.g., rolling and forming).

    - Angular speed measurement at steady state, by counting the number of rotations per unit time

    - Level detection (e.g., in the filling, bottling, and chemical process industries)

Resolver: This mutual-induction transducer is widely used for measuring angular displacements.



- Rotor contains the primary coil & It consists of a ***single two-pole winding element*** energized by an ac supply voltage V_{ref}
- Rotor is directly attached to the object whose rotation is measured.
- ***Stator*** consists of two sets of windings placed 90^0 apart.
- If the angular position of the rotor with respect to one pair of stator windings is denoted by θ, the induced voltage in this pair of windings is given by:

Demodulation:

- As for differential transformers (i.e., LVDT and RVDT) transient displacement signals of a resolver can be extracted by demodulating its (modulated) outputs.
- This is accomplished by filtering out the carrier signal, thereby extracting the modulating signal.

Synchro Transformer:

The ‘‘synchro’’ is somewhat similar in operation to the resolver. The main differences are that the synchro employs two identical rotor–stator pairs, and each stator has three sets of windings, which are placed 120^0 apart around the rotor shaft.