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So today we will be doing unit 2 transducers and the module name

is inductive transducer part one and the module number is 10.

The outline of this module is as

follows. Inductive transducer principle of change in self

inductance with a number of

turns. Principle of change and self inductance with a

change in permeability principle of variable

reluctance type transducer.

Through this module, the students will be able to define an

inductive transducer. Explain The operation of change in self

inductance with the number of turns. Explain the operation of

change in self inductance with the change in permeability.

And explain the working principle of variable

reluctance type transducer.

An inductive transducer is a device that converts

physical motion into a change in inductance.

A self inductance or mutual inductance is

varied to measure the physical qualities like

displacement force,pressure and etc.

Inductive transducers are mainly used for the

measurement of displacement.

The displacement to be measured is arranged to cause variations

in any of the three variables,number of turns.

Geometric configuration,permeability of the magnetic

material or magnetic circuits.

In the next subtopic, we're going to discuss about principle

of change in self inductance with the number of turns.

There are two types of there.One is for linear displacement

and the other one is for angular displacement. For linear

displacement, an air core coil is used to measure linear

displacement. An for angular displacement, an iron core coil

is used in both the cases.

As the number of turns are changed, the self inductance

and the output voltage also changes. So in this way the

inductance is measured.

Coming to the next topic is the principle of change in self

inductance with the change in

permeability. Over here, the Iron Core is surrounded by a

winding around a ferromagnetic former. If the Iron Core is inside

the winding, its permeability is increased because there's more flux linkages, thereby increasing his inductance and increasing its output voltage.

When the Iron Core is moved out of the winding, the permeability decreases because there's less flux linkages in the iron core, resulting in the reduction of self inductance of the coil. An output voltage. So Whenever displacement is attached to the iron core, it moves in and out, so thereby producing a change in voltage which is proportional to the displacement.

In the next subtopic, we're going to be discussing about variable reluctance type transducer in this.

The variable reluctance type transducer consists of a coil wound on a ferromagnetic core.

The displacement to be measured is applied on the target.

The target does not have any physical contact with the core on which it is mounted and is always separated by an air gap.

Over here, the reluctance of the magnetic path, the reluctance of the magnetic path is determined by the size of the air gap. We can see that the formula is RG is the reluctance is equal to length of the air gap, which is LG divided by m0 which is

called as permeability into AG,which is called as the area of

flux of the air gap.

So inductance of the coil depends upon the reluctance of

the magnetic circuit why because L is equal to N square up on RG

where N is the number of turns and RG is equal to reluctance of

the air gap. So we can say that the self inductance is inversely

proportional to the length of the air gap. So.

Whenever the target is near to the Core, the length of the air

gap is small and if the length of the air gap is small, the

reluctance of the air gap also is small and therefore the

inductance will be large and if inductance is large, the output

voltage also will be large if

the target is away from the ferromagnetic core. The length of

the air gap is large, and the reluctance also will be large.

Therefore inductance will be small, thereby producing a

small voltage across its output.So in this way or variable

reluctance type transducer is used to measure displacement. So

in the next one will be learning about a variable reluctance

type bridge circuit.

Over here, the bridge consists of two transistor coils, wounded

on each outside leg.

And tapped secondary input from the power transformer.

The Iron bar is pivoted on the center leg.

The moving member is attached to one end of the Iron Bar.

So over here, this is be the point where in a

displacement will be applied so it is balanced

only when the inductance of both the coils are the

same. That means the length of both the air gaps has to

be the same.

So what happens whenever the iron bar at point A moves and

alters the air gap. The bridge becomes unbalanced by an

amount proportional to the change in inductance.

This is proportional to the displacement of the moving

member. So the increase and decrease of inductance with

varying gap size is nonlinear,and so is the output voltage. So

in this module we have learned about what is the inductive

transducer, what are the two types of displacement which can

be measured. We can measure linear displacement as well as

angular displacement. We also have learned about what is the

effect of inductance with the change in permeability.

And also we have learned the variable reluctance type bridge

circuit. So with this we come to the end of this module.