



SNS COLLEGE OF TECHNOLOGY
An Autonomous Institution
Coimbatore-35



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

IIYEAR/ III SEMESTER

19ECT201 Electrical Engineering and Instrumentation

TOPIC -VARIABLE INDUCTANCE TRANSDUCER



VARIABLE CAPACITIVE TRANSDUCER



- **Inductive transducers** work on the principle of inductance change due to any appreciable change in the quantity to be measured i.e. measured.
- changing the flux with the help of measured and this changing flux obviously changes the inductance and this inductance change can be calibrated in terms of measured. Hence inductive transducers use one of the following principles for its working.

Change of self inductance

Change of mutual inductance

Production of eddy current

1. Change of self inductance- $L = N^2 \mu G$

Where,

$G = A/l$ and called the geometric form factor.

A = area of cross-section of the coil.

l = length of the coil.

So, we can vary self inductance by Change in number of turns, N , Changing geometric configuration, G , Changing permeability

if the displacement is to be measured by the inductive transducers, it should change any of the above parameter for causing in the change in self inductance.



2. Change of Mutual Inductance of Inductive Transducer -change of mutual inductance principle, use multiple coils

Mutual inductance between these two coils is given by

$$M = K\sqrt{L_1L_2}$$



- With the change in distance in displacement coefficient of coupling changes and it causes the change in mutual inductance. This change in mutual inductance can be calibrated with the displacement and measurement can be done.

3. Production of Eddy Current of Inductive Transducer

- when a conducting plate is placed near a coil carrying alternating current, a circulating current is induced in the plate called “EDDY CURRENT”. This principle is used in such type of **inductive transducers**.
- When a coil is placed near to coil carrying alternating current, a circulating current is induced in it which in turn produces its own flux which try to reduce the flux of the coil carrying the current and hence inductance of the coil changes. Nearer the plate is to the coil, higher will be eddy current and higher is the reduction in inductance and vice versa.
- Thus inductance of coil varied with the variation of distance between coil and plate.
- Thus the movement of the plate can be calibrated in terms of inductance change to measure the quantity like displacement