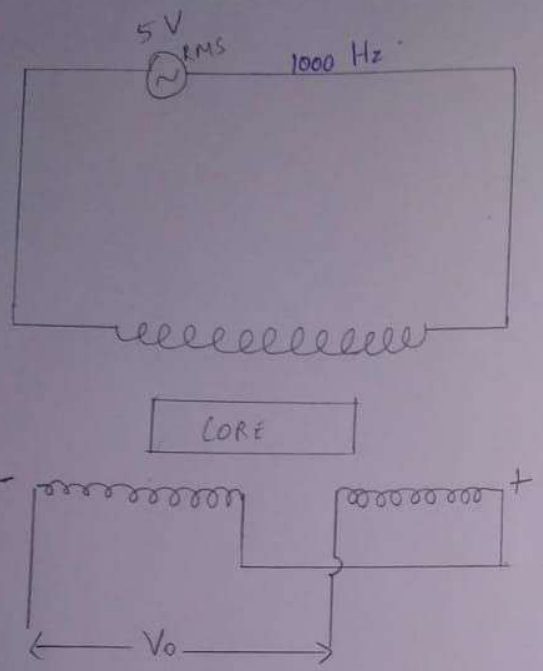
CIRCUIT DIAGRAM:



TABULATION:

	Input Voltage (V) (Vm)	Output Voltage	frequency (Hz)	Time = 1/f
Positive Displacement	7	2 V (D = 5mm)	1000	$\frac{1}{1000}$ = 1ms
Negative displacement	7	(D = -5mm)	1000	1ms

Expt: 6

CHARACTERISTICS OF LVDT
(Linear Variable Differential Transformer)

AIM:

To understand and simulate the relation between core displacement and output voltage.

APPARATUS REQUIRED:

Laptop with internet connection

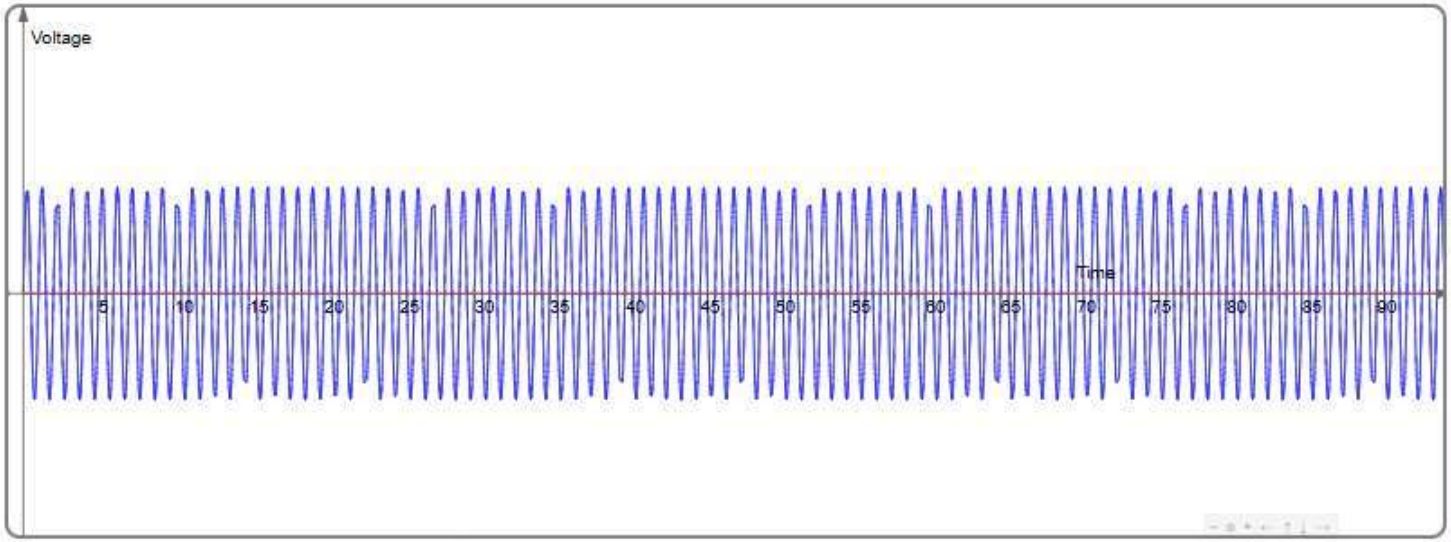
THEORY:

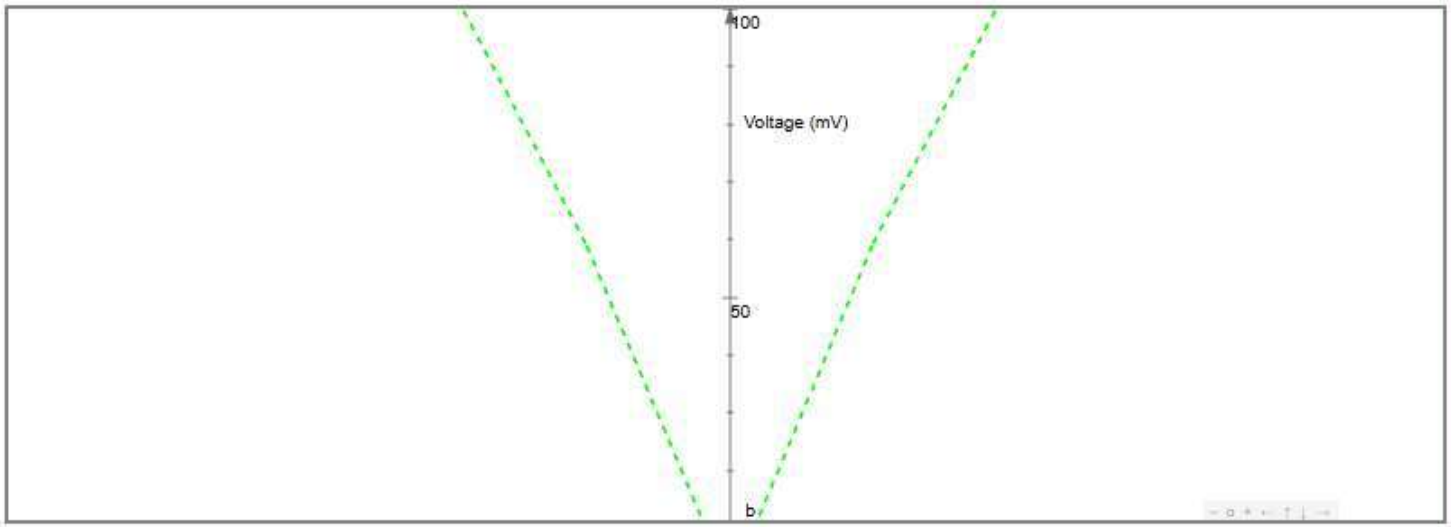
LVDT is an inductive transducer that converts linear displacement into a electrical signal. It consist of a transformer having one primary winding and two secondary windings wound on a core. As the primary is connected to an AC source, the AC current and the voltages are produced in the secondary of LVDT.

When the core is at the position of centre, the flux linking with both the secondary windings are equal. So, the emf induced in both the windings are equal, this means there is no displacement.

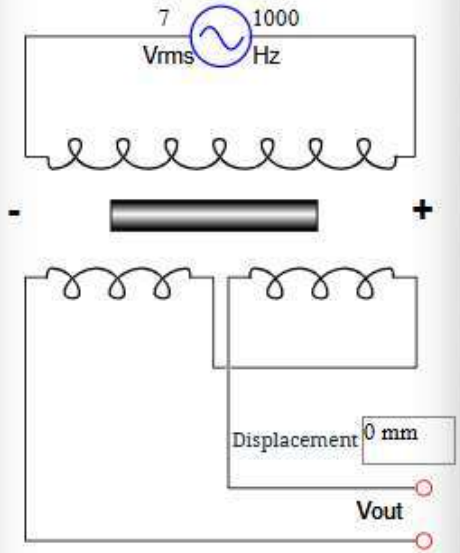
Sensor Analysis Laboratory

Linear Variable Differential Transformer





Diagram



No. of Turns: 1000

Supply voltage (Vrms): 7

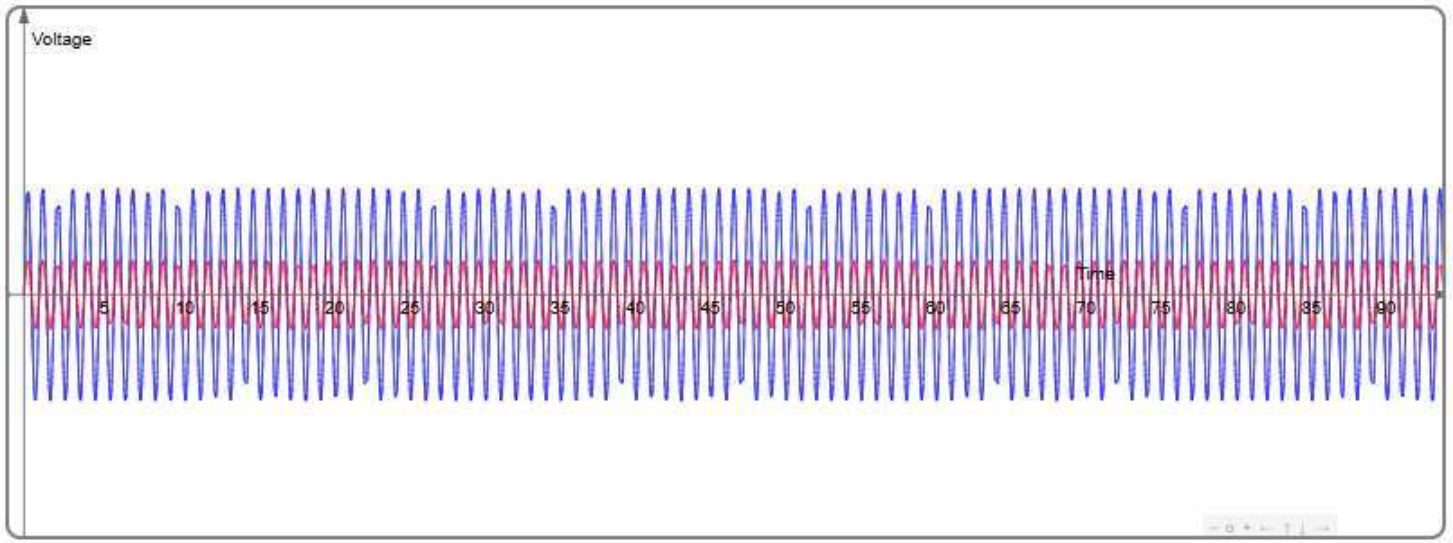
Supply frequency(Hz): 1000

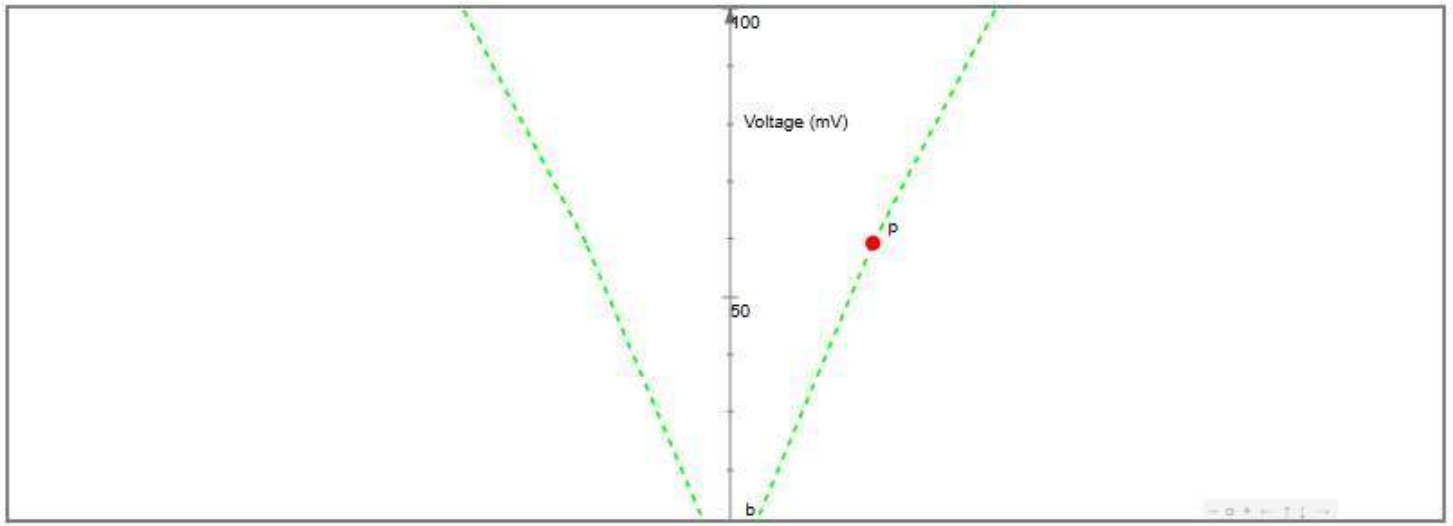
Configure | Reload

Formula

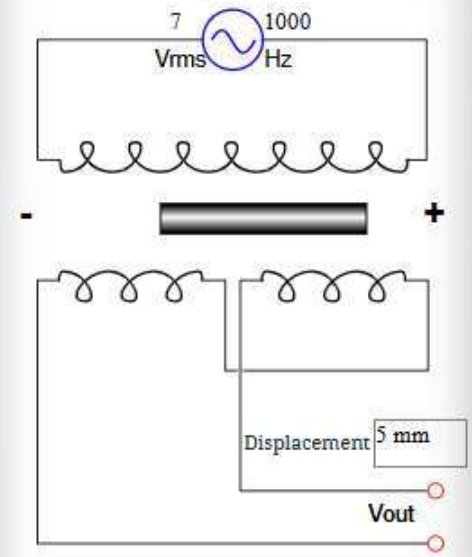
Sensor Analysis Laboratory

Linear Variable Differential Transformer





Diagram



No. of Turns: 1000

Supply voltage (Vrms): 7

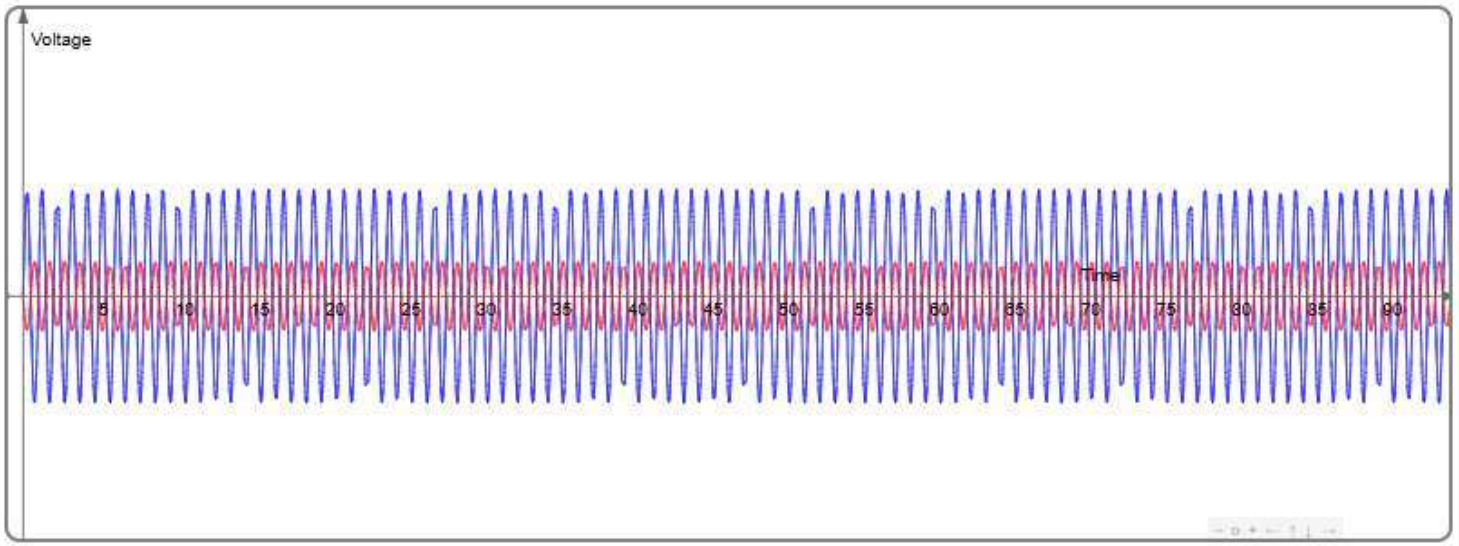
Supply frequency(Hz): 1000

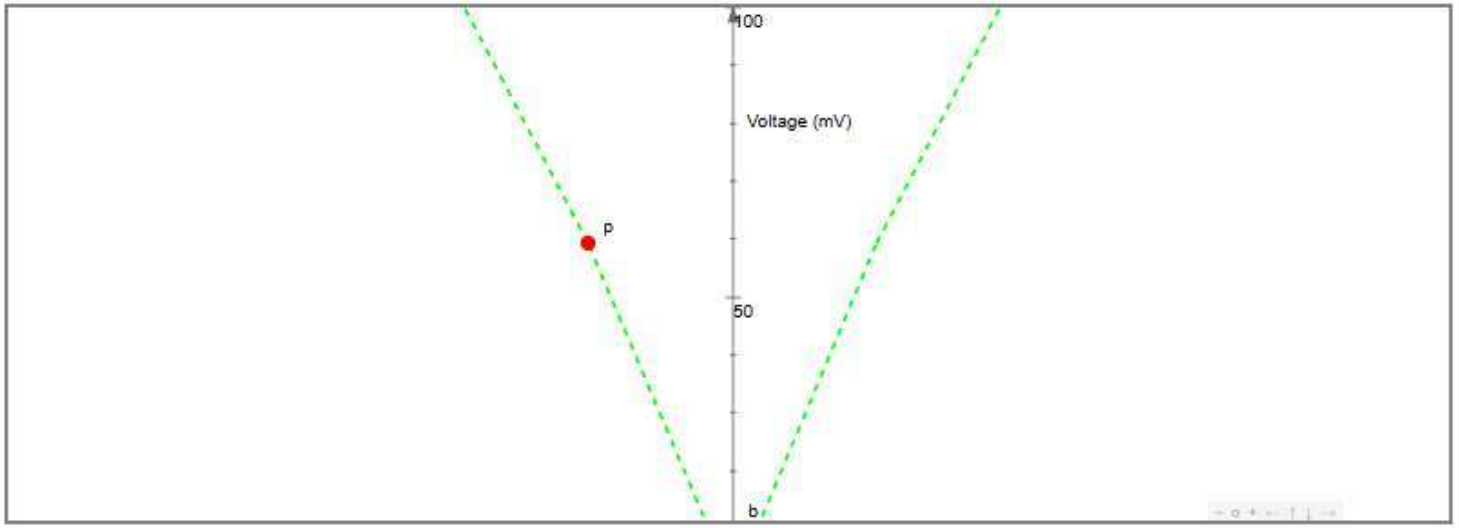
Configure | Reload

Formula

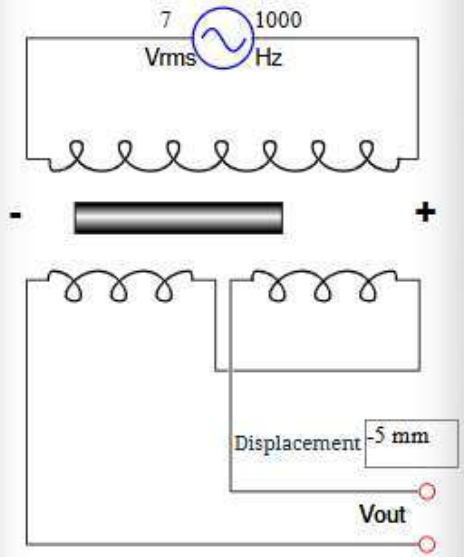
Sensor Analysis Laboratory

Linear Variable Differential Transformer





Diagram



No. of Turns:	1000
Supply voltage (Vrms):	7
Supply frequency(Hz):	1000

Configure Reload

Formula

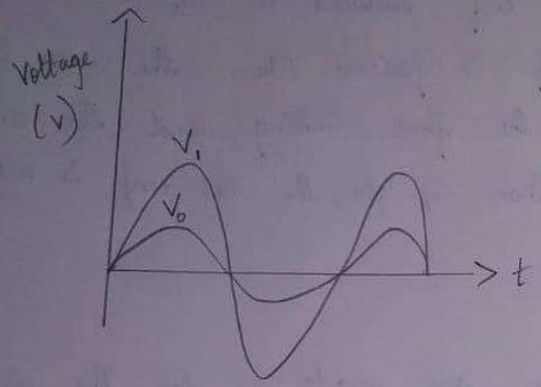
When the core is at the right, the flux linking with the secondary winding S_1 is more. So, the emf induced in S_1 is more than S_2. So, the net emf is positive. When the core is at the left, the flux linking and the emf in S_2 is more than S_1. So, the net emf is negative.

PROCEDURE:

* Connections are made as per the circuit diagram.
* Set the number of turns, supplied voltage and supplied frequency.
* Configure the parameters.
* Move the core to positive side and the negative side and observe the input voltage and output voltage waveforms.
* Plot the graph between input and output voltage.

MODEL GRAPH:

Positive displacement



Calculation:

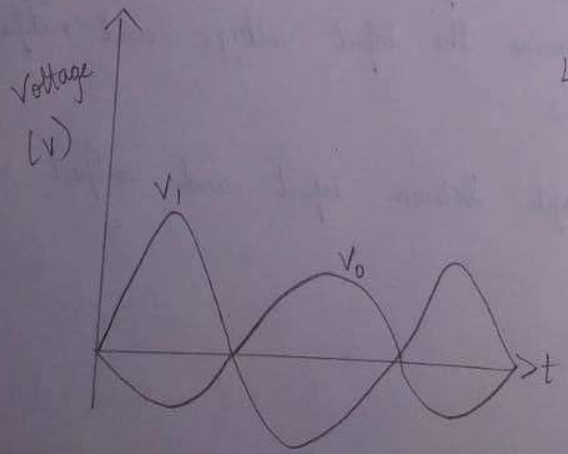
$V_m = \sqrt{2} \times V_{rms}$

$= \sqrt{2} \times 5$

$= 7V$

$T = 1ms$

Negative displacement



4 SD = 7

1 SD = 7/4 V

1.25 SD = 7/4 x 1.25

= 2.2 V

RESULT

To understand and simulate the relation between core displacement and output voltage were developed and tested successfully.