SEMICONDUCTOR PROJECT ABSTRACT

ECPC-13

1) WATER LEVEL SENSOR USING CAPACITOR

2) PLOTTING OUPUT VOLTAGE RECTIFICATION GRAPH OF FULL WAVE AND HALF WAVE RECTIFIERS USING MATLAB

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ABOUT OUR PROJECT: -

Our team did two projects. One was a water level sensor which is a capacitor made using a small plastic can and aluminium foil. The second one was plotting output voltage rectification graph for full wave and half wave rectifiers.

<u>PROJECT 1 – WATER LEVEL SENSOR: -</u>

APPARATUS REQUIRED: -

Aluminium foil, non-conducting plastic cylindrical can of appreciable diameter, water.

SETUP: -

OBSERVATIONS: -

Radius of Can = 2.5cm

Height of aluminium foil used = 10cm

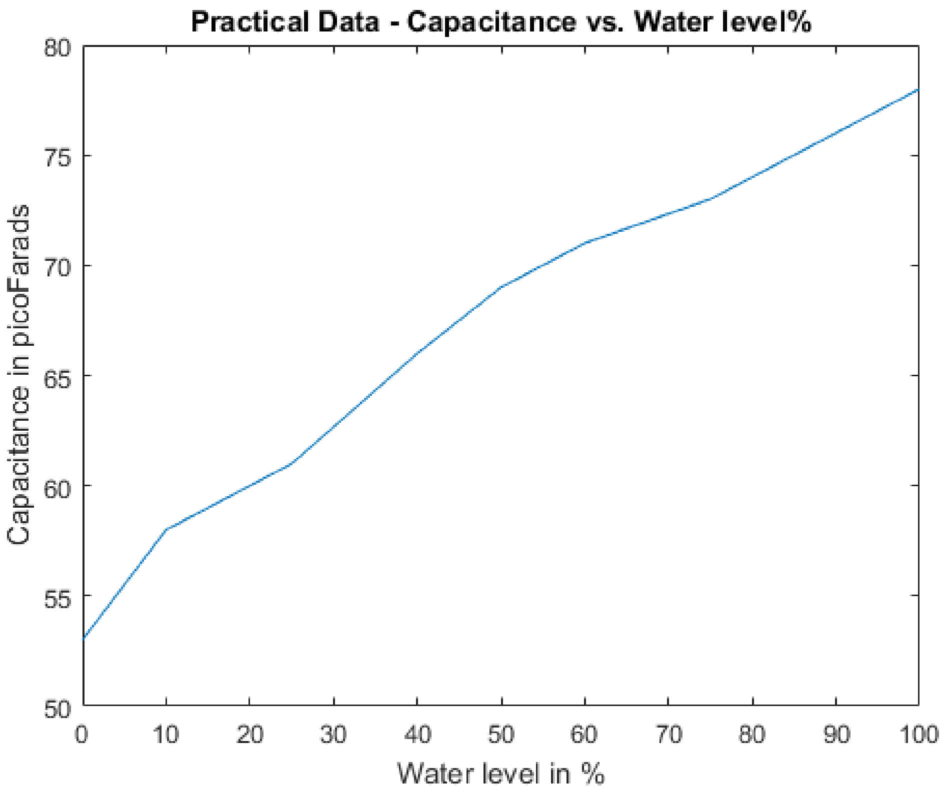
Now, if we add water up to some x cms, we can calculate the height of water by finding the capacitance and from the graph we can get the height of water level.

Capacitance of capacitor made –

HEIGHT OF WATER(cm)	CAPACITANCE(pF)
0	53
10	58
2.5	61
4	66
5	69
6	71
7.5	73
9	76
10	78

GRAPH: -

Obtained graph from practical data :



Linear and quadratic fit equations :

Linear fit equation :

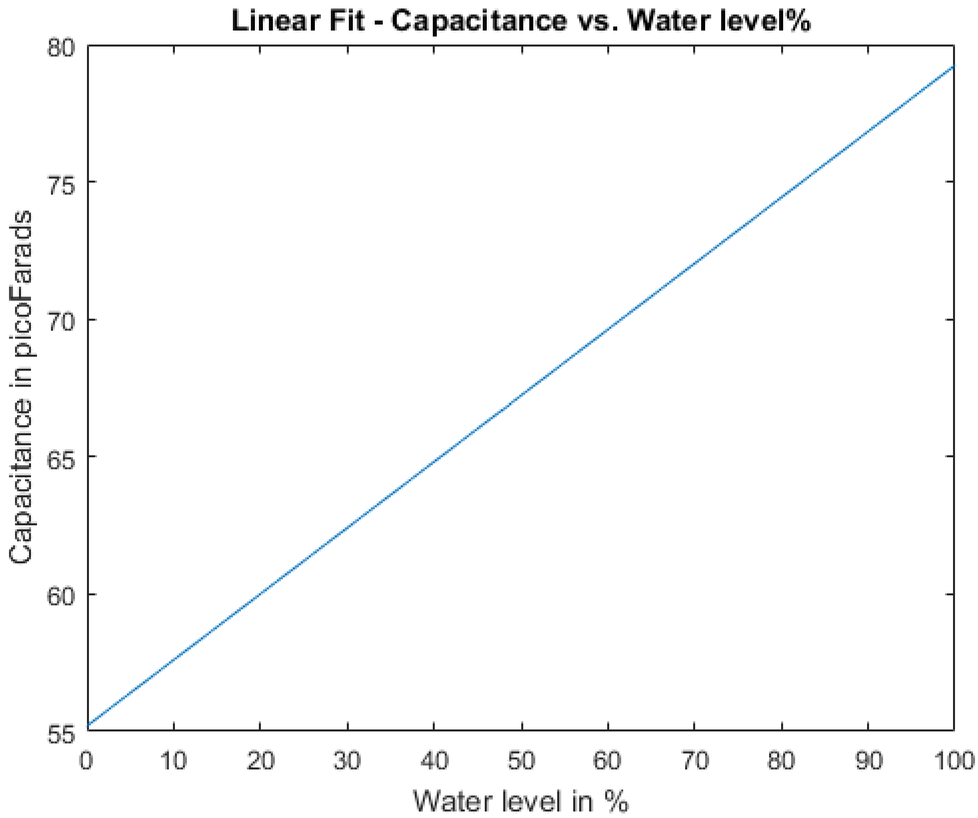
Capacitance = 0.2404*X + 55.2015

Quadratic fit equation :

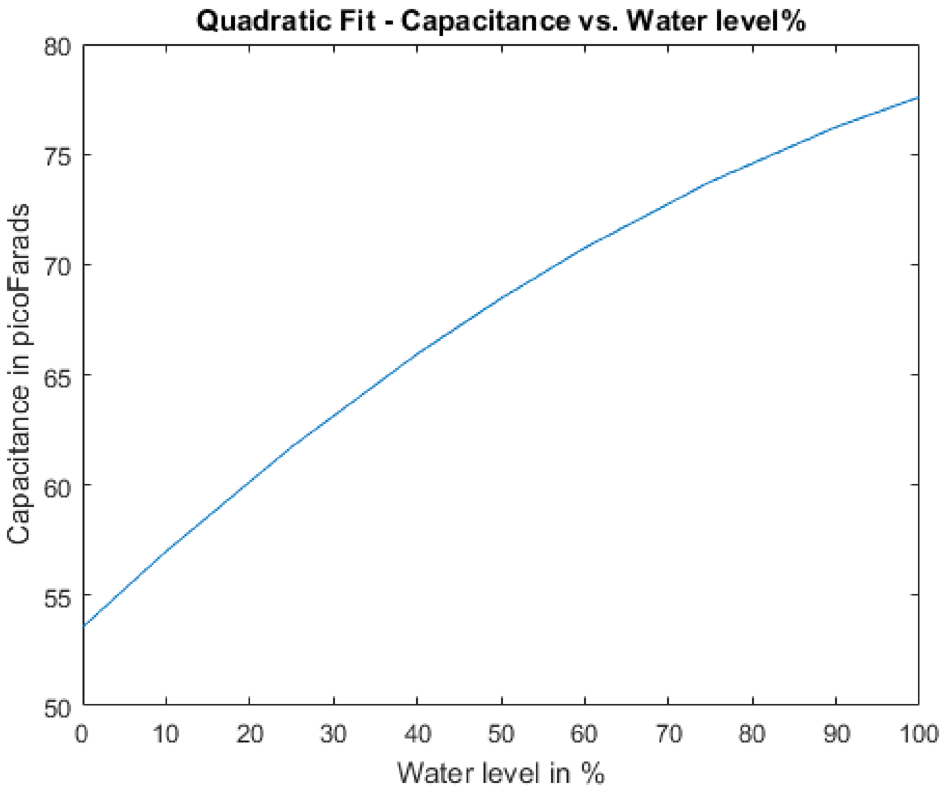
Capacitance = -0.0012*X^2 + 0.3661*X + 53.5491

where X = Percentage of water level

Obtained graph from linear fit data:



Obtained graph from quadratic fit data:



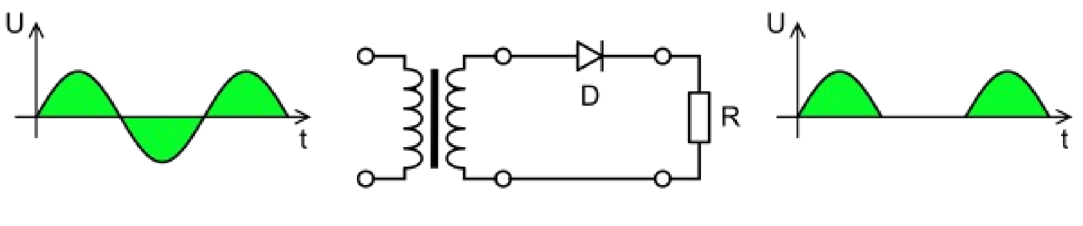
RESULT: -

Thus, a water level sensor is made using a non-conducting plastic can and using aluminium foil.

PROJECT 2 – OUTPUT VOLTAGE RECTIFICATION GRAPH OF FULL WAVE AND HALF WAVE RECTIFIERS USING MATLAB:

HALF-RECTIFIER :

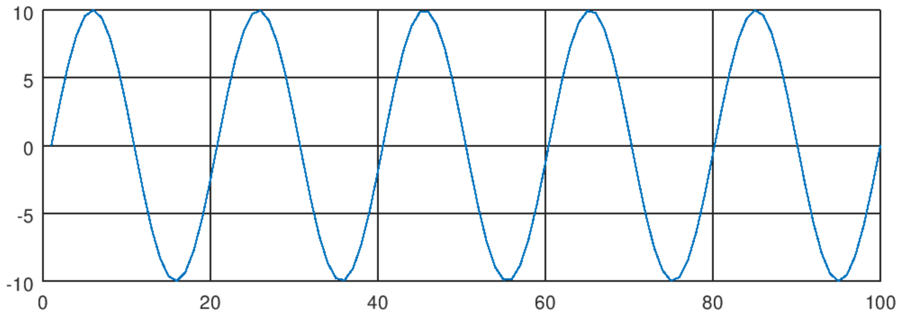
In half-wave rectification of a single-phase supply, either the positive or negative half of the AC wave is passed, while the other half is blocked. Mathematically, it is a ramp function (for positive pass, negative block): passing positive corresponds to the ramp function being the identity on positive inputs, blocking negative corresponds to being zero on negative inputs. Because only one half of the input waveform reaches the output, mean voltage is lower.

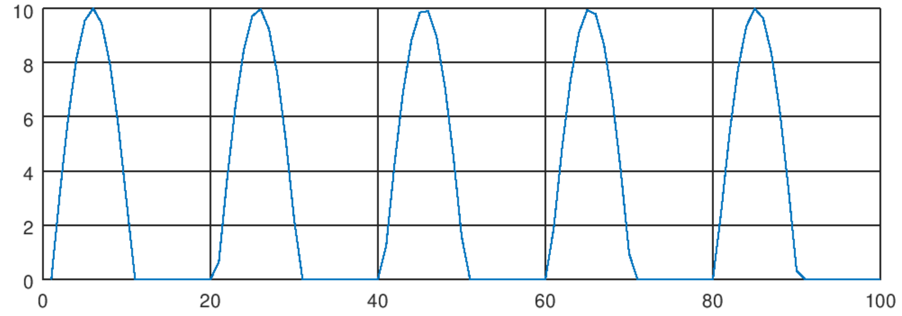


GRAPH :

Frequency : 50 Hz

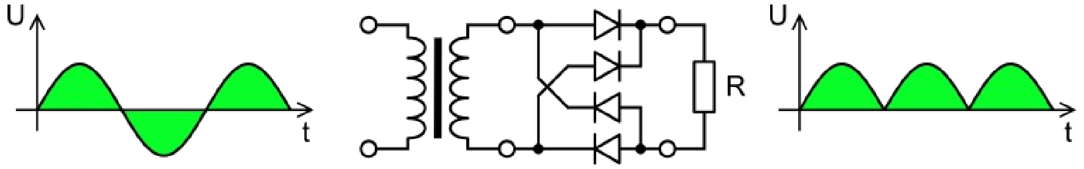
Amplitude : 10 V





FULL-WAVE RECTIFIER:

A full-wave rectifier converts the whole of the input waveform to one of constant polarity (positive or negative) at its output. Mathematically, this corresponds to the absolute value function. Full-wave rectification converts both polarities of the input waveform to pulsating DC (direct current), and yields a higher average output voltage. Two diodes and a center tapped transformer, or four diodes in a bridge configuration and any AC source (including a transformer without center tap), are needed. Single semiconductor diodes, double diodes with common cathode or common anode, and four-diode bridges, are manufactured as single components.



GRAPH:

Frequency : 50 Hz

Amplitude : 10 V