Department of Instrumentation and Control

Innovative Teaching Method

Class:	**S.E.**
Name of Method:	**Working principle of SAR TYPE ADC in Microsoft Excel**
Subject:	**Electrical Measurements and Instrumentation**
Name of Staff	**Mr. V. A. Ahirrao**
Date and Time:	**30/11/20212**
No of students:	**34/51**

Learning Objective:

To learn step by step working of Successive Approximation Register type of ADC in Microsoft Excel.

Outcome: On completion students will have understand the working of Successive Approximation Register type of ADC.

Description:

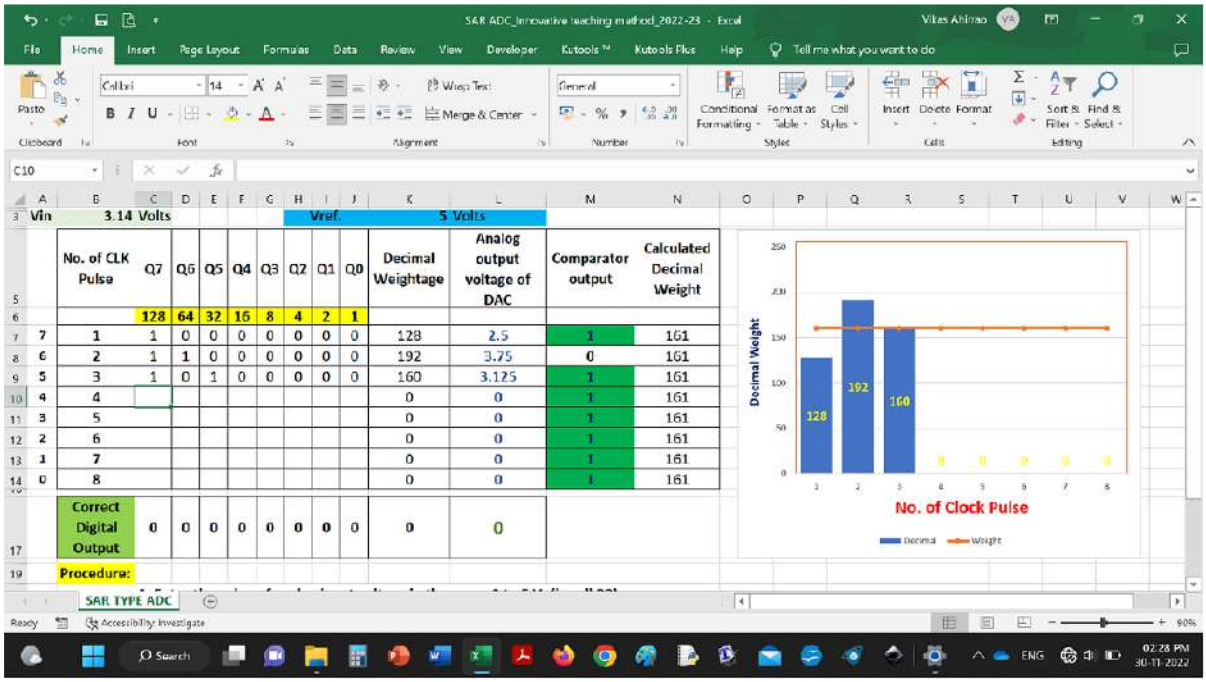
Students usually finds it difficult to understand working of Successive approximation type of ADC hence the same is being demonstrated in Microsoft excel and also chart is prepared based on the step by processing of bits starting from MSB to LSB and thereby the operation. This may prove to be helpful for students to make use of this by assuming various analog input voltages, reference voltages and verifying step by step working and observe simultaneously changes in excel chart.

Impact of Innovative Method:

Students may use the shared excel workbook for practicing the SAR ADC working simulation. Also, they will understand the use and importance of Excel.

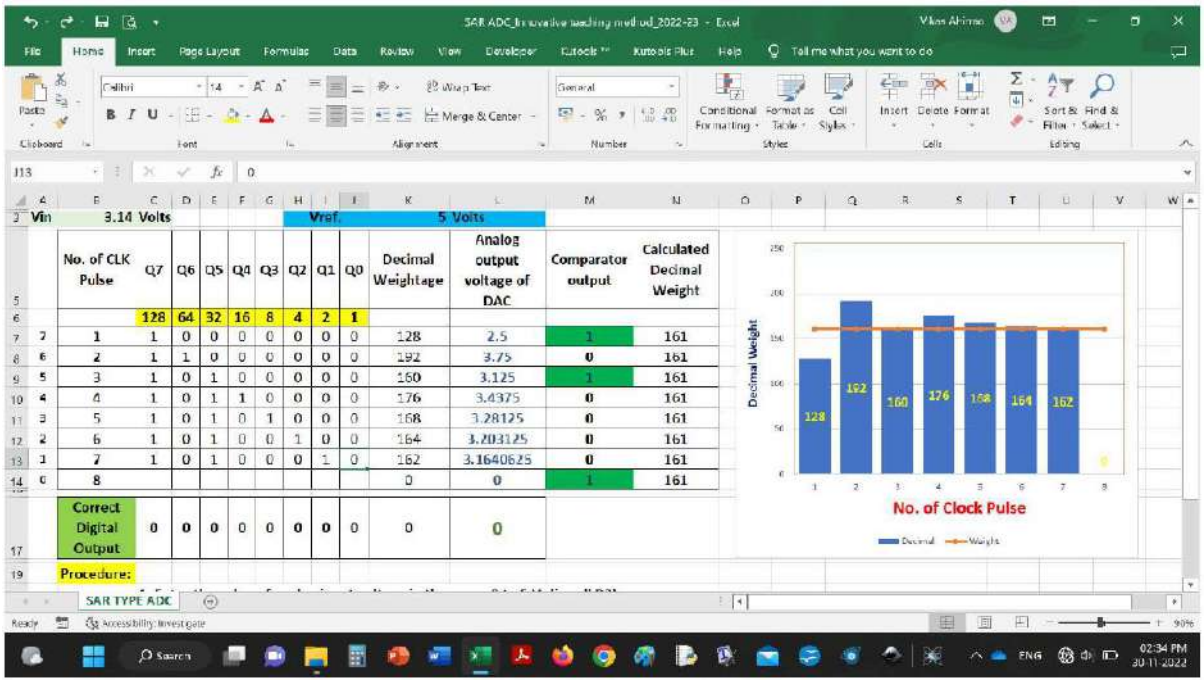
POs and PSOs: PO1, PO5, PO9, PSO1

Screenshots of Innovative Method:



Vin	3.14 Volts								Vref.	5 Volts		
	No. of CLK Pulse	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0	Decimal Weightage	Analog output voltage of DAC	Comparator output	Calculated Decimal Weight
		128	64	32	16	8	4	2	1				
7	1	1	0	0	0	0	0	0	0	128	2.5	1	161
8	6	2	1	1	0	0	0	0	0	192	3.75	0	161
9	5	3	1	0	1	0	0	0	0	160	3.125	1	161
10	4	4								0	0	1	161
11	3	5								0	0	1	161
12	2	6								0	0	1	161
13	1	7								0	0	1	161
14	0	8								0	0	1	161
17		Correct Digital Output	0	0	0	0	0	0	0	0	0		

Procedure:



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8	6	2	1	1	0	0	0	0	0	192	3.75	0	161
9	5	3	1	0	1	0	0	0	0	160	3.125	1	161
10	4	4	1	0	1	1	0	0	0	176	3.4375	0	161
11	3	5	1	0	1	0	1	0	0	168	3.28125	0	161
12	2	6	1	0	1	0	0	1	0	164	3.203125	0	161
13	1	7	1	0	1	0	0	0	1	162	3.1640625	0	161
14	0	8								0	0	1	161
17		Correct Digital Output	0	0	0	0	0	0	0	0	0		

Procedure:

Mr. V. A. Ahirrao

Subject In-charge