



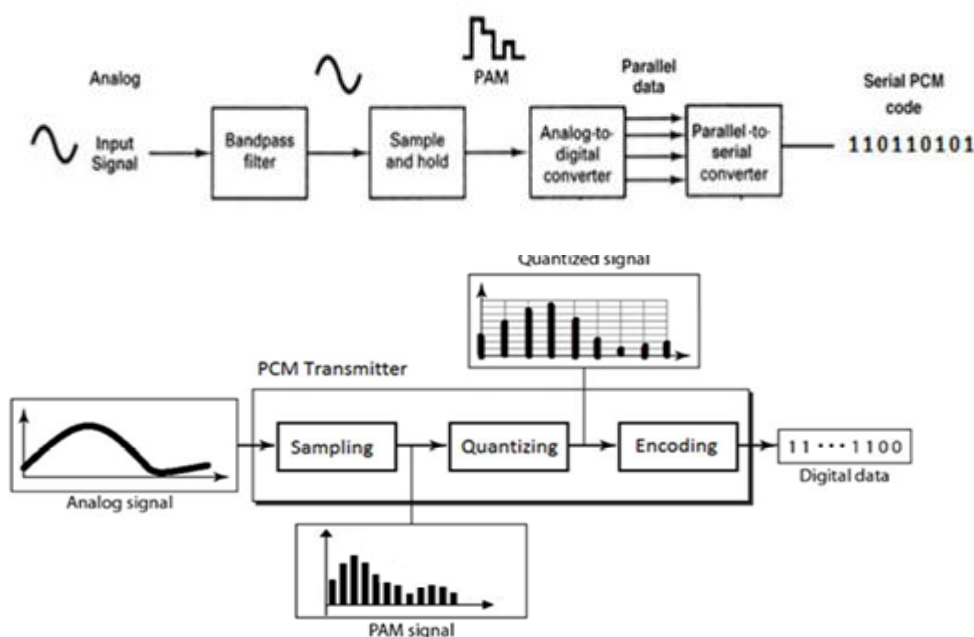
Teaching the concept with case studies in a real time scenario

Goal:

- To give in depth knowledge about pulse code modulation
- To expose to tools like MATLAB and SIMULINK

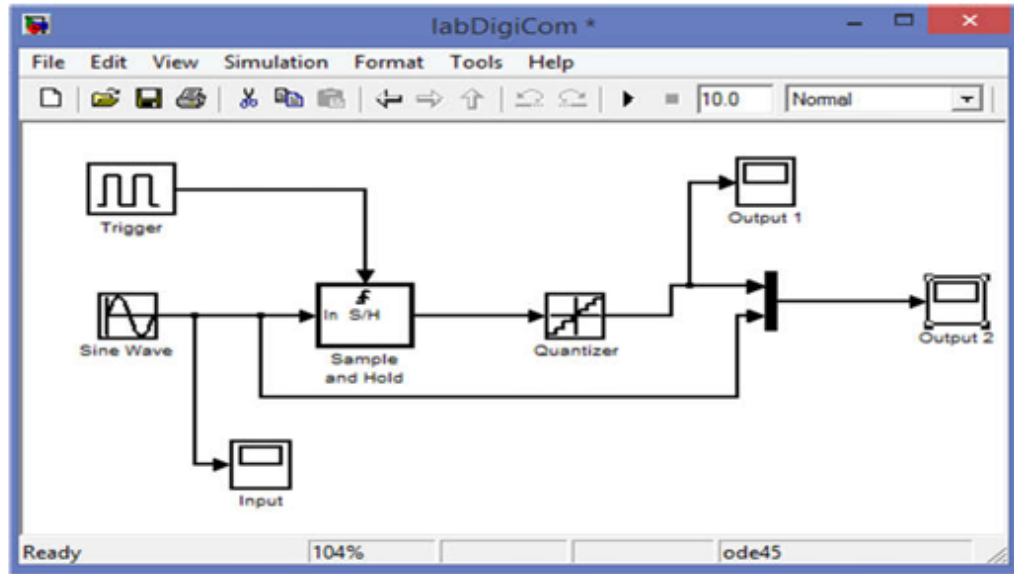
Pulse code Modulation:

Pulse Code Modulation (PCM) is a process of converting an analog signal into a digital signal (A/D conversion) for digital transmission system. The signals in PCM are binary value represented by only two possible states, either with logic 1 (high) and logic 0 (low). PCM modulation occurs in a PCM transmitter. It involves three main processes which include sampling, quantization and encoding. First process is sampling. It is the process of taking samples of the analog input signal at a rate of Nyquist sampling frequency as $(\max) 2f_m < f_s$. The sampling process in a PCM transmitter is to periodically sample the analog input and convert those samples to a multilevel Pulse Amplitude Modulation (PAM) signal. Then, the second process is quantization. Quantization is representing the sampled values of the amplitude by a finite number, which is the process of converting continuous amplitude sample into a discrete signal. The last process is encoding. Encoding is the process of converting the discrete signal (voltage or current levels) to represent 1 (high) and 0 (low) of the digital signals on the transmission path. Basically, in PCM encoding, each sample is represented as one in the set of eight bit binary words. All three processes which occur in the PCM transmitter is shown in Figure.



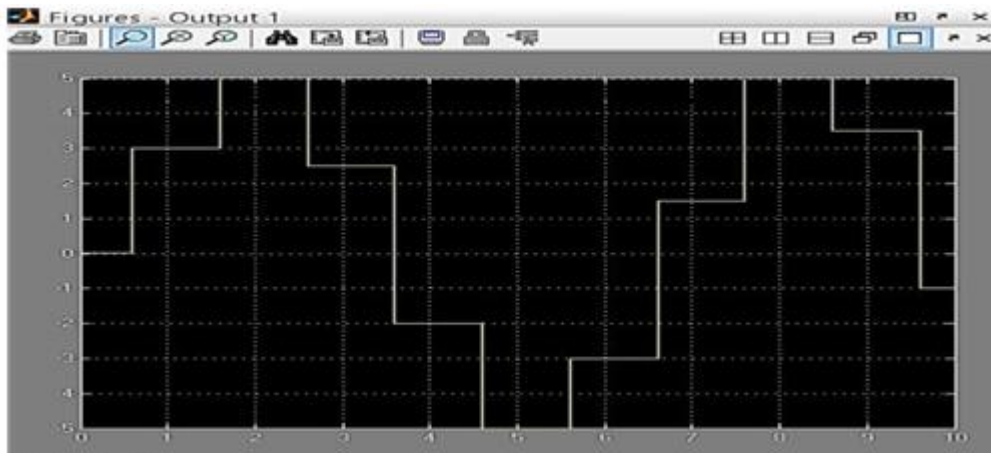


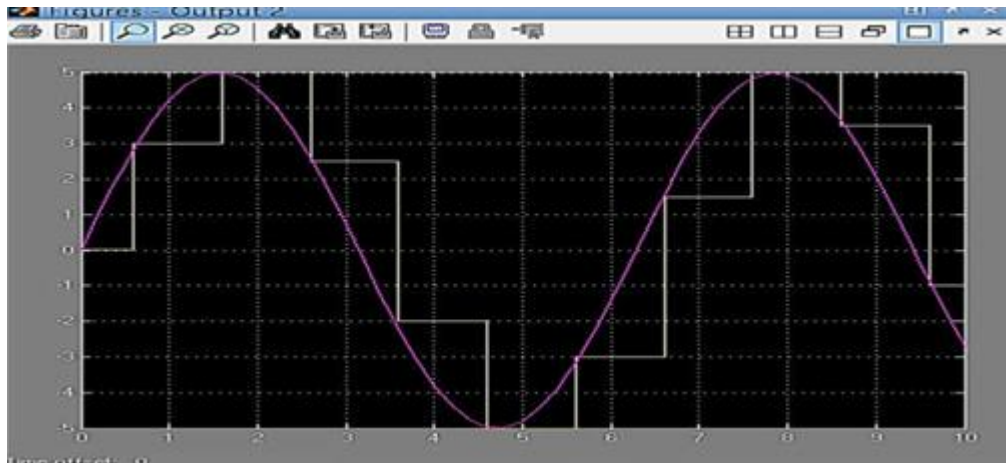
DESIGN AND SIMULATION BY MATLAB SIMULINK TOOL



Blocks	Specifications
Sine wave	Used as modulating signal.
Trigger	Used as pulse carrier signal.
Sample and hold	Samples and hold at certain amplitudes.
Quantizer	The sampled amplitudes are rounded to nearest values.
Mux	Used as multiplexing.
Scope	Used as screen to display result.

Results:





CONCLUSION

The Matlab Simulink of the PCM block diagram was studied and executed. In this work, according to the basic of PCM system, every block is implemented sequentially in Matlab Simulink. Every function of PCM system is included in a single block of Matlab Simulink, which is very helpful for the students to understand the whole PCM system.