Experiment -3

Aim:- To perform Pulse Code modulation.

Apparatus Required:- ~~Software matlab~~

Software matlab
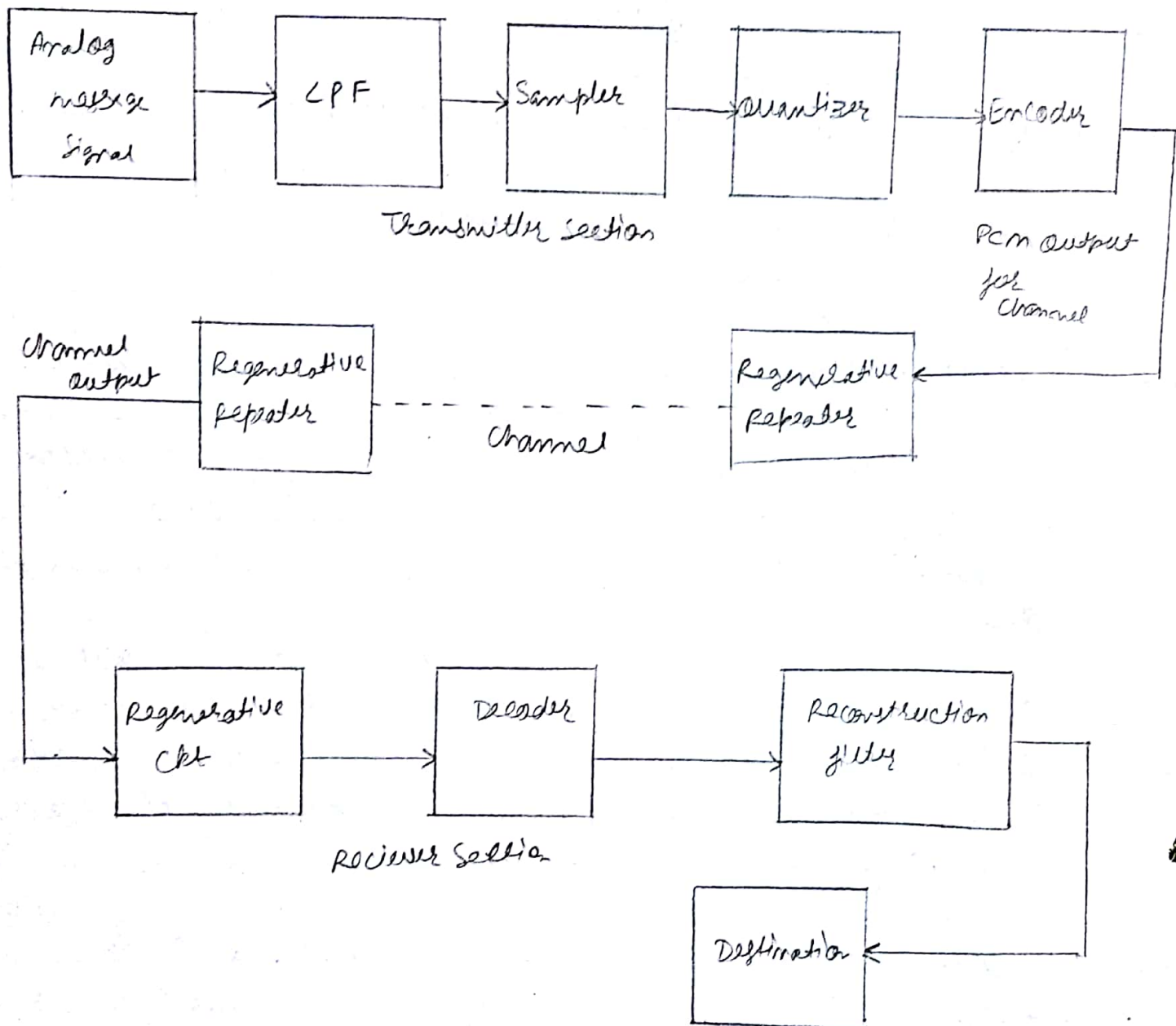
Software Required :- matlab

Theory:- Pulse Code modulation is a kind of source coding. The meaning of source coding is the conversion from analog signal to digital signal. After converted to digital signal, it is easy for us to process the signal such as encoding, filtering the unwanted signal and so on.

The transmitted section of Pulse Code modulated ckt. consists of sampling, Quantizing and Encoding. which are performed in the analog-to-digital converter section. The low pass filter prior to sampling presents aliasing of the message signal.

Lowpass filter:- This filter eliminates the high frequency components present in the input analog signal which is greater than the highest freq. of the message signal, to avoid aliasing of the message signal.

Quantizer:- It is a process of reducing the excessive bits and confining the data. The sampled output when given to quantizer, reduces the redundant bits and

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┌──────────┐       ┌───────┐       ┌─────────┐      ┌───────────┐      ┌──────────┐
│ Analog   │       │       │       │         │      │           │      │          │
│ message  │ ────▶ │  LPF  │ ────▶ │ Sampler │ ───▶ │ Quantizer │ ───▶ │ Encoder  │
│ signal   │       │       │       │         │      │           │      │          │
└──────────┘       └───────┘       └─────────┘      └───────────┘      └──────────┘
```

Transmitter section

PCM output
for
Channel

```
Channel      ┌──────────────┐                        ┌──────────────┐
output       │ Regenerative │ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─  │ Regenerative │ ◀──
             │   Repeater   │                        │   Repeater   │
             └──────────────┘        Channel         └──────────────┘
```

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┌──────────────┐       ┌─────────┐       ┌───────────────┐
│ Regenerative │       │         │       │ Reconstruction│
│     Ckt      │ ────▶ │ Decoder │ ────▶ │    filter     │
│              │       │         │       │               │
└──────────────┘       └─────────┘       └───────────────┘
```

Reciever Section

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                              ┌─────────────┐
                              │ Destination │ ◀──
                              └─────────────┘
```

Scanned by CamScanner

Compress the value.

Encoders :- The digitization of the analog signal is done by the encoders. It designate each quantized level by a binary code. The Sampling done here is the Sample and hold process. These three sections (LPF, Sampler, Quantizer) will act as an analog to digital converter. Encoding minimise the bandwidth used.

Regenerative Repeater :- It increases the Signal Strength. The output of the channel has one regenerative ckt, to compensate the Signal and also to increase the Strength.

Decoder :- The decoder ckt decodes the pulse coded waveform to reproduce the original signal. This ckt acts as demodulator.

Reconstruction Filter :- After the digital-to-analog conversion is done by the regenerative ckt and the decoder, on a low-pass filter is employed, called as the reconstruction filter to get back the original signal.

Conclusion :-
Here, the pulse code modulator ckt digitizes the given analog signal, codes it and Samples it, and then transmits it in analog form. This whole process is repeated in a reverse pattern to obtain original signal.

Rahul

Sine wave
input

PCM
output