

DSP - 13/08/20

1.3.2.1

• The first step in the process of digital signal processing is to sample the continuous-time signal.

• The sampling process is performed by multiplying the continuous-time signal by a train of Dirac impulses.

• The resulting signal is then converted to a digital signal by using an analog-to-digital converter.

• The digital signal is then processed using digital signal processing techniques.

• The final step in the process is to convert the digital signal back to a continuous-time signal.

• This is done by using a digital-to-analog converter.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

1.3.2.2

1. Sampling

2. Conversion

3. Processing

4. Reconstruction

1.3.2.3

• The sampling process is performed by multiplying the continuous-time signal by a train of Dirac impulses.

• The resulting signal is then converted to a digital signal by using an analog-to-digital converter.

• The digital signal is then processed using digital signal processing techniques.

• The final step in the process is to convert the digital signal back to a continuous-time signal.

• This is done by using a digital-to-analog converter.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

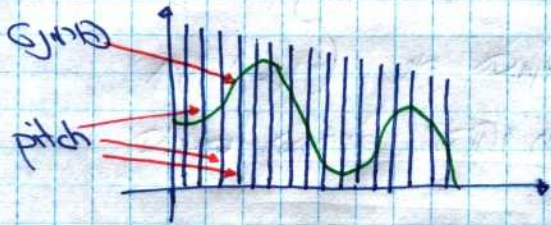
• The reconstructed signal is then filtered to remove any aliasing artifacts.

• The reconstructed signal is then filtered to remove any aliasing artifacts.

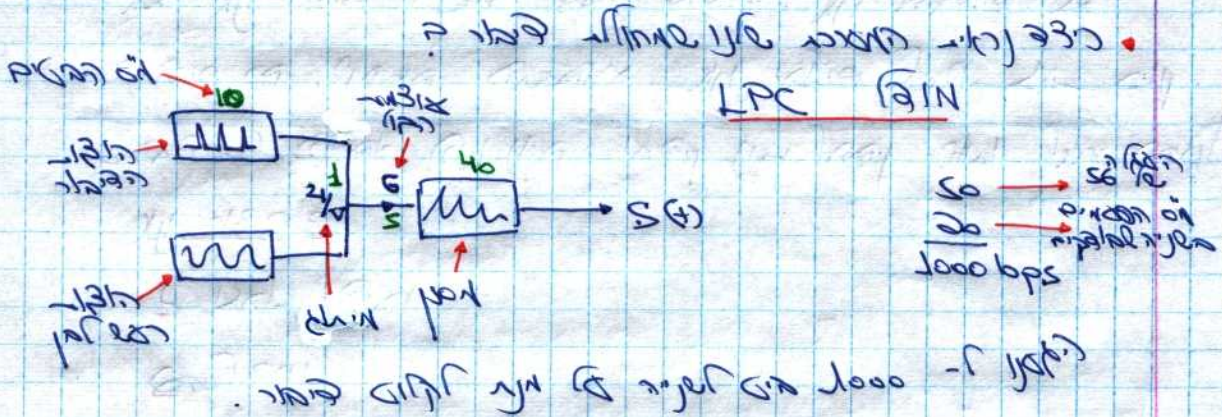
• The reconstructed signal is then filtered to remove any aliasing artifacts.



(All poles part) for AR part of - AR part is the part of the signal that is not predictable. It is the part of the signal that is not predictable. It is the part of the signal that is not predictable.



The signal is not predictable.



Linear Prediction Coding

The signal is not predictable. It is the part of the signal that is not predictable. It is the part of the signal that is not predictable.

$$S_n = f(S_{n-1}, S_{n-2}, S_{n-3}, \dots, S_{n-L})$$

$$S_n = a_1 S_{n-1} + a_2 S_{n-2} + a_3 S_{n-3} + \dots + a_L S_{n-L}$$

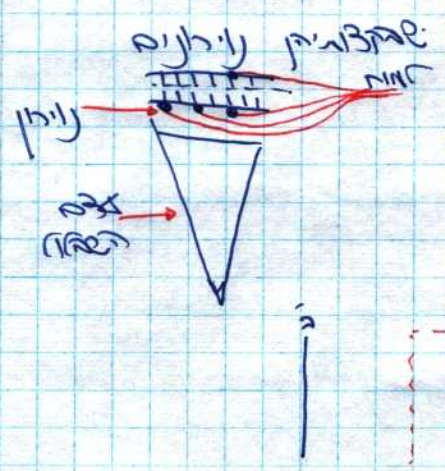
The signal is not predictable. It is the part of the signal that is not predictable. It is the part of the signal that is not predictable.

$$S_n = X_n + a_1 S_{n-1} + a_2 S_{n-2} + \dots + a_L S_{n-L}$$

The signal is not predictable. It is the part of the signal that is not predictable. It is the part of the signal that is not predictable.

Beamforming

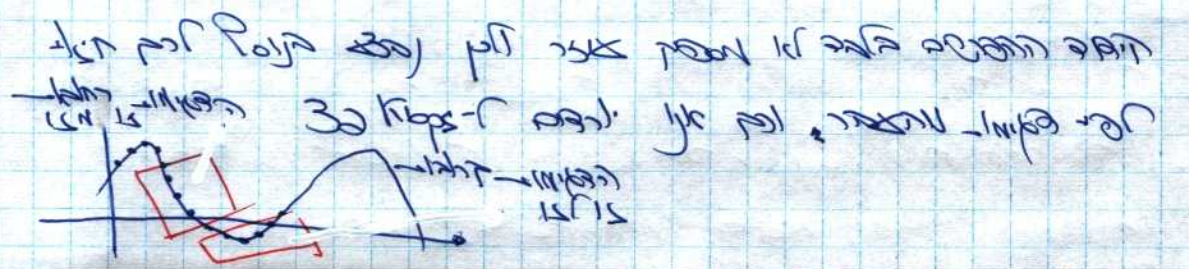
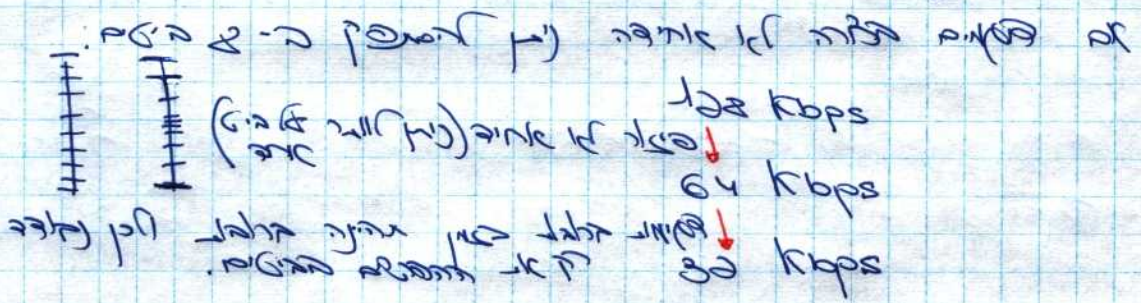
• In this - 2 or more antennas are used to transmit the signal. The signal is transmitted in a specific direction. This is done by adjusting the phase and amplitude of the signal at each antenna. This process is called beamforming. It is used in many applications like wireless communication, radar, and sonar.



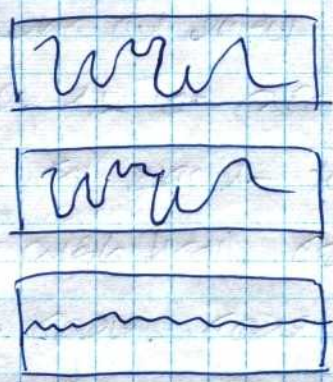
• The signal is transmitted in a specific direction. This is done by adjusting the phase and amplitude of the signal at each antenna. This process is called beamforming. It is used in many applications like wireless communication, radar, and sonar.

Beamforming

• In this - 2 or more antennas are used to transmit the signal. The signal is transmitted in a specific direction. This is done by adjusting the phase and amplitude of the signal at each antenna. This process is called beamforming. It is used in many applications like wireless communication, radar, and sonar.



- ADPCM - 16 bits per sample
- 16000 samples per second
- 16000 * 16 = 256000 bits per second



- 16 bits

- ABS - 8 bits per sample
- 16000 samples per second
- 16000 * 8 = 128000 bits per second



modern

The all the signals are transmitted via digital signals. In digital signals, the amplitude is discrete. In analog signals, the amplitude is continuous.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

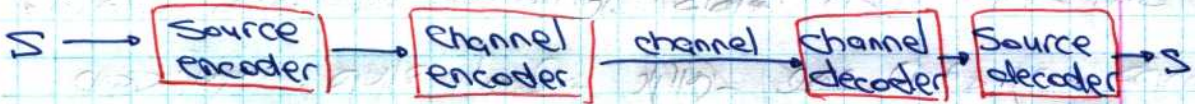
The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.



The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

The digital signals are transmitted in the form of bits.

הן מנסות להשתמש באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

Source encoder - הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

Channel encoder - הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

Channel encoder - הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

Channel encoder - הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

הבעיה היא שיש צורך באותו קו, אבל זה לא עובד.

Signal to Noise Ratio

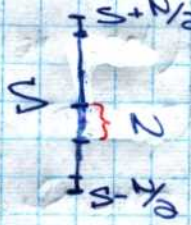
Signal Power + Noise Power

... ..

SNR: Ratio of signal power to noise power

... ..

... ..



... ..

N - Noise (var)

$$\frac{S+N}{N}$$

... ..

... ..

$$\log_2 \left(\frac{S+N}{N} \right)$$

... ..

... ..

$$C = BW \cdot \log_2 (SNR + 1)$$

Bandwidth

NRE (None Return to zero) -

... ..



... ..

... ..

... ..

... ..



... ..

... ..

... ..

RE (Return to Zero) - $\frac{1}{2}$ DC

Timing (Timing) - $R_c = \frac{1}{2}$
Timing (Timing) - $R_c = \frac{1}{2}$

$\frac{R_c - 1}{NRF}$ (Timing) - $R_c = \frac{1}{2}$

Timing (Timing) - $R_c = \frac{1}{2}$

AMI (Alternate Mark Inversion) - $\frac{1}{2}$ DC

Timing (Timing) - $R_c = \frac{1}{2}$

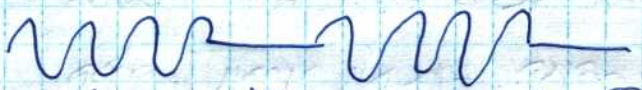


Timing (Timing) - $R_c = \frac{1}{2}$

Timing (Timing) - $R_c = \frac{1}{2}$

OOK (On Off Keying) - $\frac{1}{2}$ DC

Timing (Timing) - $R_c = \frac{1}{2}$



Timing (Timing) - $R_c = \frac{1}{2}$

FSK - જે + અથવા - એક - એક ની સાથે એક સાથે

જો અથવા એક સાથે એક સાથે એક સાથે

જો એક સાથે એક સાથે એક સાથે

FSK - એક સાથે એક સાથે એક સાથે

જો એક સાથે એક સાથે એક સાથે