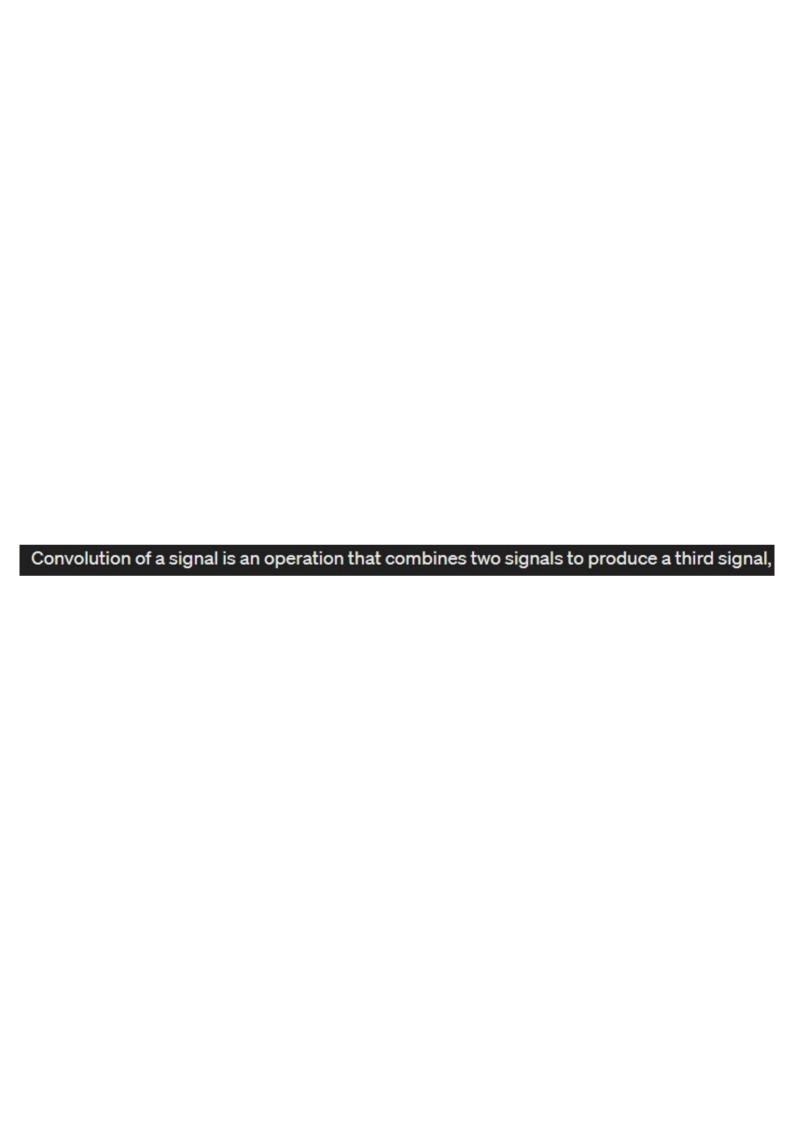
Ramp: A	signal that linearly	y increases or decr	reases over time.		
			reases over time. oponentially over tir	ne.	
				ne.	
				ne.	



Sinc: A mathematical and interpolation.	function often used in	n signal processing, v	with properties impo	rtant in filtering

 Folding: Reversing the direction of a signal by multiplying it with a flipped version of itself.
Shifting: Moving a signal horizontally along the time axis.
Scaling: Adjusting the amplitude or duration of a signal.
Addition: Combining two or more signals by adding their corresponding values at each point in time.

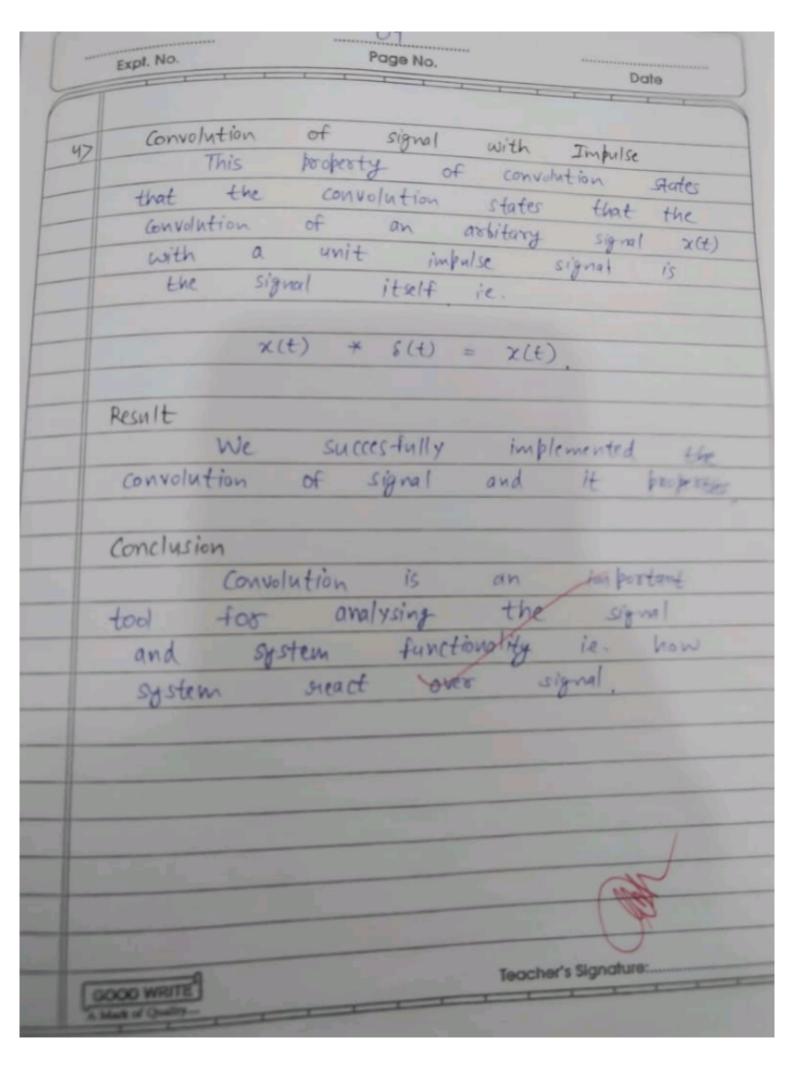


HELL PRI	
y(t)	= x,(t) * x2(t)
7 124	$= \int_{-\infty}^{\infty} \chi_1(\tau) \chi_2(t-t) dt$
	$= \int_{-\infty}^{\infty} \chi_2(t) \chi_1(t-t) dt$
8-17-17	
	Teacher's Signature:

Convolution has applications that include probability, statistics, acoustics, spectroscopy, signal processing and image processing, geophysics, engineering, physics, computer vision and differential equations. The convolution can be

- Probability and Statistics: Used in probability distributions and statistical analysis.
- Acoustics: Modeling sound propagation and reverberation.
- Spectroscopy: Analyzing spectra of electromagnetic radiation.
- Signal Processing: Filtering, noise reduction, and feature extraction.
- · Image Processing: Image enhancement, feature detection, and segmentation.
- · Geophysics: Seismic data analysis and imaging subsurface structures.
- Engineering: System modeling, control theory, and dynamic system analysis.
- Physics: Solving wave equations and modeling physical phenomena.
- Computer Vision: Object recognition, image classification, and scene understanding.
- · Differential Equations: Solving differential equations and modeling dynamic systems.

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-	Page No. Date
_	
I)	Properties of Convolution -
1>	Commutative property of Convolution The commutative property of convolution states that the order in which ne convolve two signals does not change
	The commutative property of
	states that the order in which
	convolve two signals does not change the result i.e.
	the result i.e.
	$\chi_1(t) \times \chi_2(t) = \chi_2(t) \times \chi_1(t)$
	- (c) - (2(t) + I(t)
2>	Distributive D- house
4/	Distributive Property of Convolution
	The distributive property of convolution
	states that if there are three
	Signals x1(t), x2(t) and x3(t). Then the
	convolution of x1(t) is distributive over
	the addition i.e.
	$\chi_1(t) + [\chi_2(t) + \chi_3(t)] = [\chi_1(t) + \chi_2(t)] + [\chi_1(t) + \chi_3(t)]$
	21(t) x [2(t) + 25(t)] - Line x 2003
	Associative Property of Convolution
>	accordative property of convointing
	la Maria
	states that the way convolution does
	I AND ULAUVELA
-	rot change the nesult i.e. The sesult i.e. The sesult i.e. The sesult i.e. The sesult i.e.
	$\int_{-\infty}^{\infty} \frac{f(t)}{(t)} = \left[\chi_1(t) + \chi_2(t) \right] + \chi_3(t)$
1	not change the nesalt i.e. $x_1(t) \star [x_2(t) \star x_3(t)] = [x_1(t) \star x_2(t)] \star x_3(t)$
1	GOOD WRITE* Teacher's Signature:
	GOOD WATER



is a mathematical ope ed in scenarios where s	s two cyclic signals by "\ lically.	wrapping around"

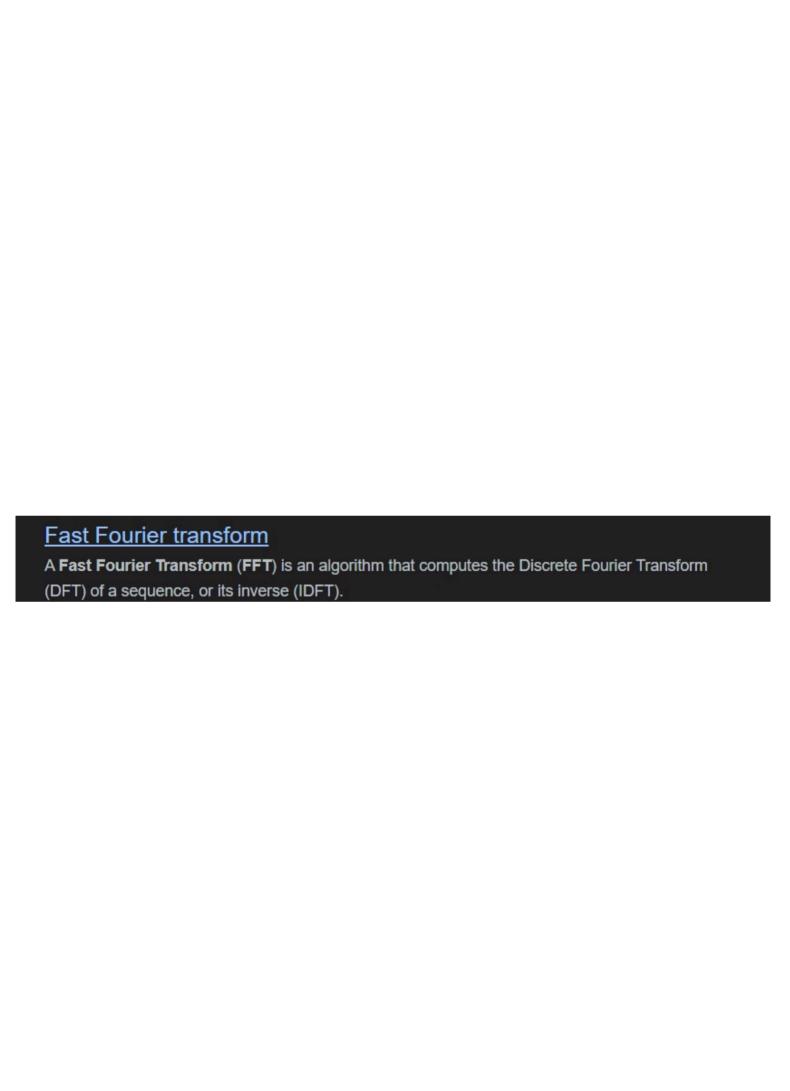
		from time domain to frequency domain,
while IDFT (Inverse Discrete l domain, enabling analysis an	d manipulation of signals in both	

for the corcin algrans.
The general expressions for DFT an
IDFT are as follows:-
Equation for DFT -
$x(k) = \sum_{n=0}^{\infty} x(n) e^{-j\frac{2kn}{N}}$
N=0
Equation for IDFT -
$\chi(n) = \sum_{k=0}^{N+1} \chi[k] e^{j2k}$
K=0
Resnit
We successfully implement the co
of DFT and IDFT in MATCAB a
2/00/10/10

	Software -> MATLAB
	Theory ->
	Circular shift Property: - The multiplication
T	circular shift Property: The multiplication of the sequence X(K) with the
Ī	complex exponential sequence e-32TTFMN is
	equivalent to the circular shift
Ī	of the x(n) by m units
	Mathematically,
	,
	$DFT \leq \chi(n-m)_N = e^{-j2\pi km/N} \cdot \chi(k)$
	Result
	we successfully implemented the
1	code of circular diff

Software Used :-	
MATLAB	
Theory :-	
Auto Correlation :-	It measures the
similarity of a sig	gnal with itself
at different time	instants Mathematically,
the auto correlation	function fxx(f) of
a discrete signal	x(n) is defined as-
fxx (x) = \$	$\chi(n)$. $\chi^*(n-k)$
N=-0	
where k represents	the time delay or
lag Anto correlation	is used to identify
periodicity (yelic 1	attern and the presence
	tres within a signal

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Cooss Correlation	in :- (soss corre	lation measures
the similarit	y between tw	o different
signals as	a function o	f time shift
between th	nem Mathematically	the cross -
correlation	function Rny Cr	between the
	crete signals	
is given	by -	
		Land State
· Fay (K)	= \(\int \gamma(n)\) y*(γ)	1-4)
In MATLAB	auto correlation	and cross
correlation	can be efficient	ciently computed
	in functions	



1. Decimation in Time (DIT) FFT:

- In DIT FFT, the input sequence is recursively divided in the time domain.
- The algorithm starts with the entire sequence and recursively divides it into smaller subsequences.
- At each stage, the FFT is computed for the smaller subsequences and combined to obtain the final FFT result.
- It typically uses a radix-2 Cooley-Tukey algorithm, where the input sequence is decomposed into smaller even and odd subsequences.

2. Decimation in Frequency (DIF) FFT:

- In DIF FFT, the input sequence is recursively divided in the frequency domain.
- The algorithm starts with the entire frequency domain and recursively divides it into smaller frequency bands.
- At each stage, the FFT is computed for the smaller frequency bands and combined to obtain the final FFT result.
- It also uses a radix-2 Cooley-Tukey algorithm but starts with the frequency domain decomposition instead of the time domain.