CAMBRIDGE INSTITUTE OF TECHNOLOGY - NORTH CAMPUS

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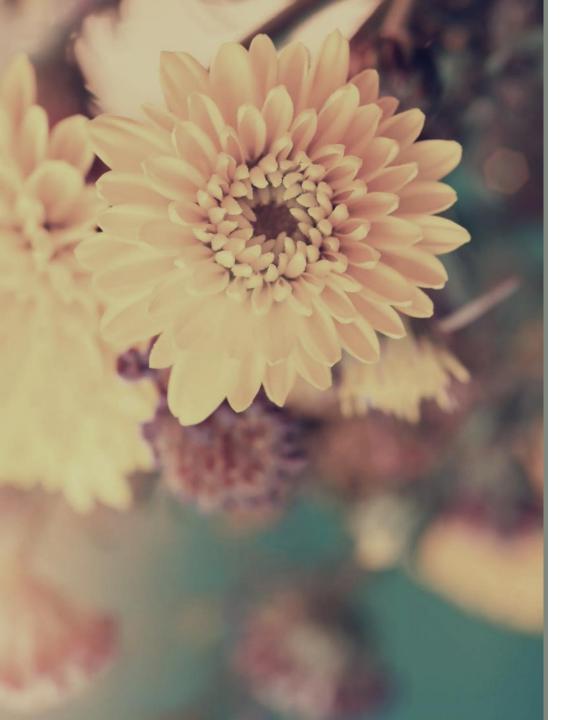
Usn:1AJ23EC005

Department:Electronics and Communication

Semester:3rd Semester Subject: Mathematics iii

To Professor Lekhana mam





Problem-1



Z-Transform:

Finding the z-transform of Function $cos((n\pi)/2 + (\pi/4))$



Get in with formula



$$cos((\frac{n\pi}{2})+(\pi/4))$$

Let
$$f(n) = cos((n\pi)/2 + \pi/4)$$

$$f(n) = \cos(\frac{n\pi}{2})\cos(\pi/4) - \sin(n\pi/2)\sin(\pi/4)$$

$$= \frac{1}{\sqrt{2}} \cos\left(\frac{n\pi}{2}\right) - \frac{1}{\sqrt{2}} \sin\left(\frac{n\pi}{2}\right)$$

$$\mathbf{Z[f(n)]} = \frac{1}{\sqrt{2}} \mathbf{Z} \left[\cos \left(\frac{n\pi}{2} \right) \right] - \frac{1}{\sqrt{2}} \mathbf{Z} \left[\sin \left(\frac{n\pi}{2} \right) \right]$$

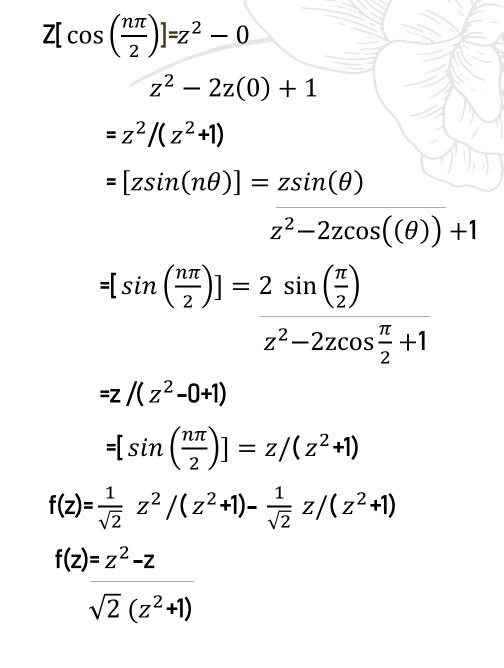
w.k.t
$$z[\cos n\theta] = z^2 - z\cos\theta$$

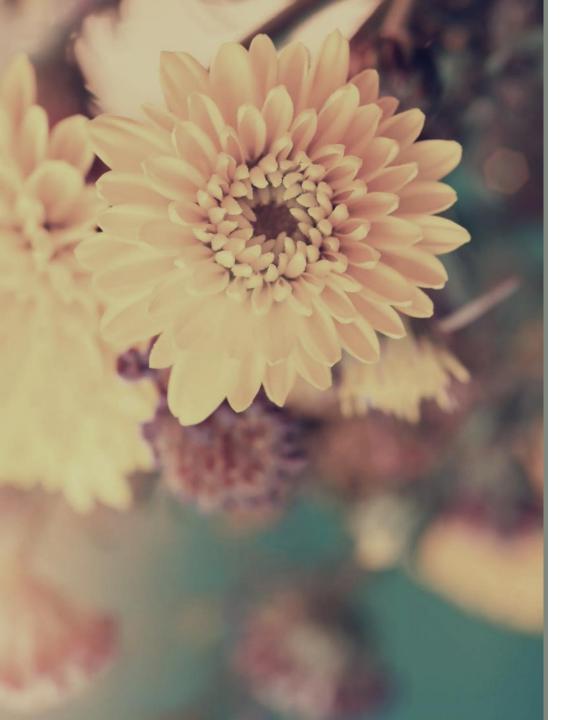
$$z^2 - 2z\cos\theta + 1$$

$$\mathbf{Z}[\cos\left(\frac{n\pi}{2}\right)] = z^2 - z\cos\left(\frac{\pi}{2}\right)$$

$$z^{2} - 2zcos(\frac{\pi}{2})+1$$

Core of problem





Problem-2



Z-Transform:

Finding the z-transform of

Function Cos(($n\pi$)/2 + θ)



Get in with formula



2}
$$\cos(2n\pi+\theta)$$
Let $f(n)=\cos(n\pi/2+\theta)$
 $f(n)=\cos(n\pi/2)\cos\theta - \sin(n\pi/2)\sin\theta$
 $Z\{f(n)\}=\cos\theta \ Z[\cos(n\pi/2)]-\sin\theta \ Z[\sin(n\pi/2)]$
w.k.t
 $Z[\cos \theta]=\frac{z^2-z\cos\theta}{z^2-2z\cos\theta+1}$
 $Z[\cos(n\pi/2)]=z^2-z\cos(\pi/2)+1$
 $Z[\cos(n\pi/2)]=z^2$
 z^2+1

Core of problem

$$z[\sin (n\theta) = z\sin \theta]$$

$$z^{2}-2z\cos \theta+1$$

$$z[\sin (n\pi/2)] = z\sin (\pi/2)$$

$$z^{2}-2z\cos(\pi/2)+1$$

$$=z/(z^{2}+1)$$

$$F(z) = z^{2}\cos\theta - z\sin\theta$$

$$z^{2}+1$$

$$z^{2}\cos\theta - z\sin\theta$$

$$z^{2}+1$$

Thank you

-Bhagya_s_b

