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To
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Problem-1

Z-Transform:

Finding the z-transform of

Function $cos((n\pi)/2 + (\pi/4))$

Get in with formula

- Finding the Z-transform of the following function:

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

Let f(n)= cos((nπ)/2+π/4)

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

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

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

w.k.t $z[\cos n\theta] = \frac{z^2 - zcos\theta}{z^2 - 2zcos\theta + 1}$

$Z\left[\cos\left(\frac{n\pi}{2}\right)\right] = \frac{z^2 - zcos(\frac{\pi}{2})}{z^2 - 2zcos(\frac{\pi}{2}) + 1}$

Core of problem

$$Z[\cos\left(\frac{n\pi}{2}\right)]=z^2-0$$

$$z^2-2z(0)+1$$

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

$$=[zsin(n\theta)]=\frac{zsin(\theta)}{z^2-2zcos((\theta))+1}$$

$$=[sin\left(\frac{n\pi}{2}\right)]=\frac{2\ \sin\left(\frac{\pi}{2}\right)}{z^2-2zcos\frac{\pi}{2}+1}$$

$$=z/(z^2-0+1)$$

$$=[sin\left(\frac{n\pi}{2}\right)]=z/(z^2+1)$$

$$f(z)=\frac{1}{\sqrt{2}}\ z^2/(z^2+1)-\frac{1}{\sqrt{2}}\ z/(z^2+1)$$

$$f(z)=\frac{z^2-z}{\sqrt{2}\ (z^2+1)}$$

Problem-2

Z-Transform:

Finding the z-transform of

Function $\mathrm{Cos}((n\pi)/2 + \theta)$

Get in with formula

2} Cos(2nπ+θ)

Let f(n)=cos(nπ/2+θ)

f(n) = cos(nπ/2)cos θ - sin(nπ/2)sinθ

Z{f(n)}=cosθ Z[cos(nπ/2)]−sinθ Z[sin(nπ/2)]

w.k.t

$$Z[\cos n\theta] = \frac{z^2 - z\cos\theta}{z^2 - 2z\cos\theta + 1}$$

$$Z[\cos(n\pi/2)] = \frac{z^2 - z\cos(\pi/2)}{z^2 - 2z\cos(\pi/2) + 1}$$

$$Z[\cos(n\pi/2)] = \frac{z^2}{z^2 + 1}$$

Core of problem

$$z[\sin(n\theta)] = \frac{z\sin\theta}{z^2 - 2z\cos\theta + 1}$$

$$z[\sin(n\pi/2)] = \frac{z\sin(\pi/2)}{z^2 - 2z\cos(\pi/2) + 1}$$

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

$$F(z) = \frac{z^2\cos\theta}{(z^2+1)} - \frac{z\sin\theta}{(z^2+1)}$$

$$F(z) = \frac{z^2\cos\theta - z\sin\theta}{z^2 + 1}$$

Thank you

-Bhagya_s_b