Question **1**

Complete

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Consider a causal and stable LTI system S whose input and output y[n] are related through second order difference equation:

$y[n] - \frac{1}{a[9]}y[n-1] - \frac{1}{a[9]}y[n-2] = x[n]$

1. Determine the frequency response $H(e^{j\omega})$ for the system S
2. Determine the impulse response h[n] for the system S

Question **2**

Complete

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Find the fourier transform of:

$\delta(n - a[0]) + \delta(n + a[0])$

Question **3**

Complete

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Determine the unilateral and bilateral Laplace Transform of:

$x(t) = e^{-a[0](t+1)}u(t+1)$

Question **4**

Complete

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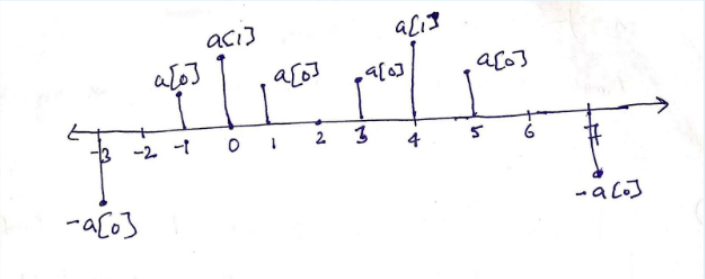
Let $X(e^{j\omega})$ denote the Fourier transform of the signal x[n] given the figure. Perform following calculations with explicitly evaluating $X(e^{j\omega})$

- Evaluate $X(e^{j0})$
- Find angle of $X(e^{j\omega})$
- Evaluate $\int_{-\pi}^{\pi} X(e^{j\omega})d\omega$
- Find $X(e^{j\pi})$



Note: The height of a[0] and a[1] can vary depending upon the value of a[0] & a[1].

Question **5**

Complete

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Let $x[n]$ be a real and odd periodic signal with period $N = 7$ and Fourier series coefficients a_k. Given that,

$a_{15} = a[0]j, a_{16} = a[1]j, a_{17} = a[2]j$

Determine the value of a_0, a_{-1}, a_{-2} and a{-3}.