DTFT Homework

① $x[n] = \{ \underset{\uparrow}{2}, -1, 1, 3, 5 \}$ $\quad h[n] = \{ \underset{\uparrow}{2}, 6, 2 \}$

Find $y[n] = x[n] * h[n]$. You can use Matlab.

② $H(e^{j\omega}) = \dfrac{1 + e^{-j\omega}}{(1 - \frac{1}{2}e^{-j\omega})(1 - \frac{1}{3}e^{-j\omega})}$

Give the partial fraction expansion of $H(e^{j\omega})$.

Find $h[n]$.

③ $x[n] = e^{j\frac{\pi}{3}n} \quad -\infty < n < +\infty$

$H(e^{j\omega}) = \dfrac{1}{1 - 0.9e^{-j\omega}}$

Find $|H(e^{j\pi/3})|$, $\angle H(e^{j\pi/3})$ and $y[n]$

④ $y[n] - \frac{3}{4}y[n-1] + \frac{1}{8}y[n-2] = x[n]$

Find $H(e^{j\omega})$ and $h[n]$.

⑤ $x[n] = 3\left(\frac{1}{2}\right)^n u[n] + 4\left(\frac{1}{3}\right)^n u[n]$

Find $X(e^{j\omega})$