Opg 6.1

Input signal: $x[n] = e^{j(0.4\pi n - 0.5\pi)}$

System: $y[n] = x[n] - x[n-1]$

$$y[n] = e^{j(0.4\pi n - 0.5\pi)} - e^{j(0.4\pi(n-1) - 0.5\pi)} = e^{j(0.4\pi n - 0.5\pi)} - e^{j(0.4\pi n - 0.5\pi)} \cdot e^{-j0.4\pi}$$

$$= e^{j(0.4\pi n - 0.5\pi)} \cdot (1 - e^{-j0.4\pi}) = e^{j(0.4\pi n - 0.5\pi)} \cdot 1.176 \cdot e^{j0.3\pi}$$

$$= 1.176 \cdot e^{-j0.2\pi} \cdot e^{j0.4\pi n} = 1.176 \cdot e^{j(0.4\pi n - 0.2\pi)} = A \cdot e^{j(\hat{\omega}_0 n + \phi)}$$

$\underline{A = 1.176}$ $\underline{\hat{\omega}_0 = 0.4\pi}$ $\underline{\phi = -0.2\pi = -0.628[rad] = -36^\circ}$