

1.

It so happens that this function can be simplified as:

$$\begin{aligned}w(j) &= \frac{-1+j^3}{-2+j+j^2} \\&= \frac{(j-1)(j^2+j+1)}{(j-1)(j+2)} \\&= \frac{j^2+j+1}{j+2}\end{aligned}$$

To find the vertical asymptote :

$$j+2=0$$

$$j=-2$$

There is a vertical asymptote at $j=-2$

To find the horizontal asymptote :

First we must compare the degrees of the polynomials.

The numerator contains a 3rd degree polynomial while the

denominator contains a 2nd degree polynomial.

Since the polynomial in the numerator is a higher degree than the denominator, there is no horizontal asymptote.

To find the oblique asymptote :

we must divide the numerator by the denominator $\frac{-1+j^3}{-2+j+j^2} = \frac{j^2+j+1}{j+2} = \frac{3}{j+2} + (j-1)$

There is an oblique asymptote at $s=j-1$

