

## I. OVERVIEW

Given:

$$y = \Delta t + \Delta v \quad (1)$$

## II. TIME-DOMAIN

Since:

$$\Delta t = \frac{d_{\vec{m}s}}{c} \quad (2)$$

Where:

$$c = 343 \pm c_{\text{adj}} \quad (3)$$

$$c_{\text{adj}} = [0, 10] \quad (4)$$

$$\Delta D_{\vec{m}s} = \sqrt{(x_s - x_m)^2 + (y_s - y_m)^2} \quad (5)$$

Thus:

$$\Delta t = \frac{\sqrt{(x_s - x_m)^2 + (y_s - y_m)^2}}{343 \pm [0, 10]} \quad (6)$$

## III. AMPLITUDE-DOMAIN

If:

$$\begin{bmatrix} W \\ X \\ Y \end{bmatrix} = S * \begin{bmatrix} \sqrt{2} \\ \cos \Theta_s \\ \sin \Theta_s \end{bmatrix} \quad (7)$$

And:

$$m(\Theta, p) = (1 - p)m_{\text{omni}} + pm_{\text{bi}} \quad (8)$$

Where:

$$m_{\text{omni}} = 1 \quad (9)$$

And:

$$m_{\text{bi}} = \sin \Theta_m + \cos \Theta_m \quad (10)$$

Then:

$$\Delta v = \begin{bmatrix} W \\ X \\ Y \end{bmatrix} * m(\Theta, p) \quad (11)$$

Which is:

$$\Delta v = S(1 - p)\sqrt{2} + p(S \sin \Theta_m \sin \Theta_s + S \cos \Theta_m \cos \Theta_s) \quad (12)$$

However:

$$\Delta v = S(1 - p)\sqrt{2} + pS(\cos(\Theta_m - \Theta_s)) \quad (13)$$

Which is:

$$\Delta v = S[(1 - p)\sqrt{2} + p(\cos(\Theta_m - \Theta_s))] \quad (14)$$

Thus:

$$m(\Theta_{m-s}, p) = (1 - p)\sqrt{2} + p \cos \Theta \quad (15)$$

And:

$$\Delta v = S * m(\Theta_{m-s}, p) \quad (16)$$

## IV. CONCLUSION

Therefore:

$$y[n] = n((1 - p)\sqrt{2} + p \cos \Theta) + \hat{t} \frac{\sqrt{(x_s - x_m)^2 + (y_s - y_m)^2}}{343 \pm [0, 10]} \quad (17)$$