

## PRACTICAL 2

```
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// Program to determine the instantaneous field of a plane wave
// Clear workspace and console
clc; clear;

// Input parameters
disp("Enter the parameters for the plane wave:");
amplitude = input("Amplitude (A): "); // Magnitude of the wave
frequency = input("Frequency (f in Hz): "); // Frequency of the wave in Hz
phase = input("Phase ( $\phi$  in degrees): "); // Initial phase of the wave
position = input("Position (z in meters): "); // Position along the propagation axis
time = input("Time (t in seconds): "); // Time instant

// Speed of light in free space (if applicable)
c = 3e8; // m/s

// Compute the angular frequency ( $\omega$ ) and wavenumber (k)
omega = 2 * %pi * frequency; // Angular frequency
wavelength = c / frequency; // Wavelength
k = 2 * %pi / wavelength; // Wavenumber

// Convert phase from degrees to radians
phase_rad = phase * (%pi / 180);

// Compute the instantaneous field
instantaneous_field = amplitude * cos(omega * time - k * position + phase_rad);

// Display the result
disp("The instantaneous field of the plane wave is:"); disp(instantaneous_field);
```

### **OUTPUT:**

"Enter the parameters for the plane wave:" Amplitude (A): 10

Frequency (f in Hz): 1E9

Phase ( $\phi$  in degrees): 45

Position (z in meters): 1

Time (t in seconds): 0.01

"The instantaneous field of the plane wave is:"

2.5881904