```
//HERTZIAN DIPOLE
// EXP- 10
//MAYANK BARMAN
//8562
c = 3e8; // Speed of light in m/s
frequency = 1e9; // Frequency in Hz (1 GHz)
wavelength = c / frequency; // Wavelength in meters
L = wavelength / 2; // Length of the dipole (half-wavelength)

// Radiation Resistance calculation
R_r = 80 * %pi^2 * (L / wavelength)^2 ;
disp("Radiation Resistance (Rr): " + string(R_r) + " ohms");

// 3D Radiation Pattern of Hertzian Dipole
theta = linspace(0, %pi, 180); // Angle from 0 to π (polar angle)
phi = linspace(0, 2*%pi, 360); // Azimuthal angle from 0 to 2π
[THETA, PHI] = ndgrid(theta, phi); // Create meshgrid for angles

// Radiation pattern (P(θ,φ)   sin^2(θ))
P_theta_phi = sin(THETA).^2;
X= P_theta_phi .* sin(THETA) .* cos(PHI);
Y= P_theta_phi .* sin(THETA) .* sin(PHI);
Z= P_theta_phi .* cos(THETA);

// Plotting the 3D radiation pattern
clf;
surf(X, Y, Z); // 3D surface plot
xlabel("X-axis");
ylabel("Y-axis");
zlabel("Z-axis");
title("3D Radiation Pattern of Hertzian Dipole");
colorbar();
// Show color bar to indicate magnitude/
```

OUTPUT:

"Radiation Resistance (Rr): 197.39209 ohms"