W13 due to 1/4 (submit online at NTUCOOL before 9 am)

1. In CST, design a half-wavelength dipole antenna with the fundamental resonant frequency at 5 GHz. The radius of the wire of the dipole is 0.5 mm. The feeding gap is 0.2 mm and exciting impedance is 50 Ω. Plot (a) the reflection coefficient spectrum and input impedance including its real and imaginary parts from 3 GHz to 7 GHz, (b) Smith chart, (c) broadband radiation efficiency and total efficiency, (d) surface current at the resonant frequency, (e) 3D radiation pattern (E-field pattern). Plot the (f) radiation pattern, (g) directivity, (h) gain, in the E- & H- plane