

Homework No. 3

1. Verify the equations provided in your class notes and calculate the coefficient of scattered Bragg modes generated from a sinusoidal surface given by

$$f(x) = 0.5 \cos(\pi x)$$

when illuminated by plane wave with wavelength $\lambda = 1$ at incidence angles $\theta_i = 45^\circ$ and $\phi_1 = 45^\circ$. Assume Region 0 is air and Region 1 is a homogeneous dielectric medium with $\varepsilon_1 = 4\varepsilon_0$. Do the calculated Bragg coefficients satisfy the conservation of energy?