

Homework #6

1. Using Born approximation derive the first-order bistatic scattering coefficient of a slab of random medium with a small permittivity fluctuations above a homogeneous slab. Suppose $\langle \epsilon_1 \rangle = (2 + i0.001)\epsilon_0$, its variance is $\sqrt{\langle \tilde{\epsilon}^2 \rangle} = 0.1\epsilon_0$, $\epsilon_2 = 6\epsilon_0$, slab thickness = 0.6 m, and assume an exponential correlation function with $\ell = 2$ cm. Plot the bistatic scattering coefficient at 10 GHz and $\theta_i = 45^\circ$.
2. Show that for a spherical exclusion volume

$$\overline{\overline{G}}(\vec{r}) = \overline{\overline{G}}_{\text{ps}}(\vec{r}) - \frac{\overline{\overline{I}}}{3k_0^2} \delta(\vec{r}).$$