

Homework #4

1. In your notes on “Statistics of Scattered Fields from Random Media,” derive equations (29), (32), and (45).
2. Find the pdf of the second element of Stokes’ vector $|E_v|^2 - |E_h|^2$ assuming E_v and E_h are jointly Gaussian complex quantities.
3. Verify equations (38)–(41) on page 13 of your notes on “Physical Optics Approximation.”
4. Verify equations (54) and (55) for \overline{C}_0^h and \overline{C}_0^v and those for \overline{C}_1^h and \overline{C}_1^v .
5. Plot the backscattering coefficients for a rough surface with rms height 5 cm and correlation length 20 cm at $f = 10$ GHz as a function of incidence angle using both G.O. and P.O. approximations. Use both exponential and Gaussian correlation functions. Is an exponential correlation function an appropriate correlation function to be used in conjunction with P.O. or G.O.?